ADDIS ABABA SCIENCE AND TECHNOLOGY UNIVERSITY

COLLEGE OF ARCHITECTURE AND CIVIL ENGINEERING

Time & Program Its regulation & Management under MDB-FIDIC (2006), PPA (2011) & Applicable Laws.

BY

BELAYNEH ESHACHEW

MAY 2017

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APPROVAL PAGE

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BY

Belayneh Eshachew.

Member of examining board:

1. Dr. Mesay Danile.	……	……
Examiner	SIGNATURE	Date
2. Mr. Addisu Bekle.	……....	……..
(Head, civil Eng, dept)	SIGNATURE	Date
3. Dr. Brook Abate.	……..	……..
(Dean 'College of	SIGNATURE	Date
(Architecture Civil Eng		
Chairman)		

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ABBREVIATIONS

PPA =Public Procurement Agency
FIDIC = international federation desingenieur-consultils
MDB = Multilateral Development Bank
CPM = Critical path method
COMD = Commencement Date
BAC = Budget at completion
CPI = Cost performance index
LD = Liquidated Damage
DLP = Defects Liability Period
CD = Completed date
EOT= extension of time
GCC= general condition of contract
Art= article
CPMA=construction project management
E/C=excusable compensation delay
E/N=excusable non compensable delay

N/N =none excusable delay

DD= delay damage

MOWUD= ministry of work and urban development

SBD=standard bidding document

ICB=international competitive bidding

SCC =specific condition of contract

ABSTRACT

The construction industry plays a significant role in a nation's social and economic development by which sustainable and transforming growth is realized. Developing countries in particular benefits indisputably from the construction industry whereby it secures new employments to citizens, transfers modern technical/technological schemes, ensures better infrastructures and basic facilities urging improved life standards as a whole. These construction deliverables are meant to serve the intended purpose optimally if their provision is timely addressed to the end user. Many projects completed and/or under progress in Ethiopia are witnessed to have time overrun caused by delays/disruptions which ultimately draws cost overrun and farfetched achievement. Projects delivered on time will not only serve the intended mission but also minimizes unexpected over budget execution, compromised quality, undesired disputes between involved parties likely to create sore relationship for future projects and minimized capacity building opportunity to involved parties. The number of public and private projects, in Ethiopia is increasing regardless of the ability to complete most of these projects on time giving birth to claims. Construction claims generated by contractors charges the owners even more because of delays, inefficiency, lost productivity, etc and same holds true when claims are generated from the clients. Ideally a project should be completed without delay and the need for any claims. This paper deals with time by means of special emphasis to delay and disruption along with their claims under the MDB-FIDIC 2006, PPA 2011 Conditions of Contracts & the applicable Law. Accordingly, Clauses and articles which are related with time are selected to fulfill the requirement of the objective of the paper.

Researching on the problem of delay in construction, the report adopted a descriptive research design. The sample size was established through the method of simple random Sampling.

The instrument used to collect data for the research was a structured questionnaire this study is about cause of delay in civil engineering projects in Ethiopian. It sought the views of clients, consultants, and contractors on the relative importance of the factors that cause delays in construction projects in Ethiopian

Key word and phrase

Delay and disruption claims under the MDB-FIDIC 2006, PPA 2011 Conditions of Contracts & the applicable *Law*

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CHAPTER ONE

1.1 INTRODUCTION

The important role construction plays in the economy underlines the necessity for assessing delays and disruptions. in construction projects with a view of identifying the causes of delays and their effects on the successful completion of the projects as dealt fewer than two conditions of construction contracts and applicable law. The study introduces these concepts in simpler easy to understand and comprehensive manner as a plat form to further study such related topics.

In Ethiopia construction industry delays and time overruns in Public Sector investments particularly Housing project can raise the capital-output ratio and bringing down the efficiency of investments. Yet in most of Ethiopian Government projects there are no estimates of the delays and cost overruns, and of their opportunity cost. Factors internal to the public sector system and Government largely account for the delays and cost overruns. Poor project management, improper implementation, inadequate funding of projects, bureaucratic indecision, and the lack of coordination between enterprises are common. Appraisal by the Government very often given an emphasis is only on the form of the project proposal rather than on its content and action. Time is an extremely important issue in construction. Together with cost and quality, it is a primary objective of project management, and a major criterion by which the success of a project is judged.

1.2 OBJECTIVE AND SCOPE OF THE STUDY

The main objective of this study is to broadly discuss, compare, contrast and analyze the concept of time as managed and regulated under two prominent conditions of construction contracts (FIDIC-MDB 2006 and PPA2011) and Applicable law; with special emphasis given to Delay and Disruption claims arising from concept of the same.

The study begins with review of the important aspects of construction process, delays, disruptions and claims related to project program. It then takes a casual analysis to establish the extent of delays in the project, the causes for the delays and the effect of the delays on the construction project. It further tries to address what has to be done to minimize the effect of construction delays and disruptions in Ethiopia in a way to enhance delivery of construction projects on time to the required quality within budget (tolerable overrun, if so happens).

1.3 METHODOLOGY

Among the available methods in collecting data two methods were adopted, these are literature review and questionnaires. Literature was reviewed to establish what others have documented on the subject matter. Useful information was collected from seminar and workshop papers, journal papers and Questionnaires were used to gather information for the study. The other approach adopted for the study is by gathering and organizing information from relevant concerned stake holders by means of interview and practical experience in addition to moderate site visits. These

data will be tabulated, analyzed and concluded along with I recommendations and suggested short and long term exit strategies. Hence the study will mainly focus and try to address the use, application and interpretation of time under (FIDIC-MDB 2006 and PPA2011) and Applicable laws whose misuse or proper handling is also dealt with in terms of delay, disruption and respective claims without going further in depth into related subjects. The method we follow for this particular paper is comprehensive and based on factual feed backs collected from concerned stake holders of the industry.

1.4 Research Questions

i. what are the causes of projects delay in Ethiopian?
ii. What are the effects of delays in engineering projects?
iii. What are the strategies adopted to reduce delays in Ethiopian engineering project?
VI what is causes of delay of in the project?

CHAPTER TWO

2.0 LITRATURE REVIEW

2.1 DELAY AND CAUSE DELAY

Mansfield (1994) studied the causes of delay and cost overrun in construction projects in Nigeria. The results revealed that the most important factors were financing and payment for completed works, poor contract management, changes in site conditions, shortage of material, and poor planning.

Mezher (1998) conducted survey of the causes of delays in the construction industry in Lebanon from the perception of owners, contractors and architectural/engineering firms. The survey

Concluded that owners had more concerns with regard to financial issues, contractors regarded contractual relationships the most important, while consultants considered project management issues to be the most important causes of delays.

Battaineh (1999) evaluated the progress reports of 164 building and 28 highway projects constructed during the period 1996- 1999 in Jordan. The results indicate that delays were extensive e.g. the average ratio of actual completion time to the planned contract duration was 160.5% for road projects and 120.3% for building projects.

Al-Momani (2000) conducted a quantitative analysis of construction delays by examining the records of 130 public building projects constructed in Jordan during the period of 1990- 1997.

The researcher presented regression models of the relationship between actual and planned project duration for different types of building facilities. The analysis also included the reported frequencies of time extensions for the different causes of delays.

The researcher concluded that the main causes of delay in construction projects related to designers, user changes, weather, site conditions, late deliveries, economic conditions, and increase in quantities.

Talukhaba (1988)investigated on time and cost performance of construction projects and observed that construction claims in construction are majorly caused by delays in completing projects on Vietnam (Long, 2004), Nepal and Nigeria (Aibinu and Jagboro, 2002) and in Ghana (Frimpong, 2003). Factors ranging from inflation, project complexity, inaccurate material estimation, financing, change orders, design changes, late submission of drawing, poor specification, incorrect site information, poor contract management among many others were found to be main sources of overruns.

Assaf (1995) studied the causes of delay in large building construction projects in Saudi Arabia. The most important causes of delay included approval of shop drawings, delays in payments to contractors and the resulting cash-flow problems during construction, Design changes, conflicts in work schedules of subcontractors, slow decision making and Executive bureaucracy in the owners' organizations, design errors, scarce and incompetent labour.time.

Musa (1999) conducted a study on factors influencing delays in water projects in Kenya funded by the Government Lack of capacity for contractor to execute projects diligently was found to be the cause of delay in his study.

A similar study by Karimi (1998) focused on factors contributing to cost overruns in projects under the Ministry of Water and the observations in the study were that most projects experience delays due to the fact that the clients delay in honoring progress payments towards contractors.

Jonathan J. Shi (2001) presented a paper on method for calculating activity delays and Appraising their contributions to project delay.

The method consisted of a set of equations, which could be easily coded into a computer program that would provide fast access to project delay information. The observations were that delays are mostly caused by the non-payment by the client to the contractor and lack of coordination of project activity by the consulting team.

Sabah Alkass, Mark Mazerolle, Frank Harris (1996) presented a paper which discusses Delays analysis techniques that issued by practitioners in the construction industry and This technique is called the Isolated Delay Type (IDT). The techniques was tested Against a case example and its strengths and weaknesses underscored. It was found To give fair results in the determination of causes of delay.

A detailed study by the New South Wales (NSW) Australia Royal Commission into Productivity in the Building Industry (1992) of 20 commercial high-rise buildings

Kagiri (1998) identified the important factors that influenced the overruns in the power projects as: contractor inabilities, improper project preparation, resource planning, and Interpretation of requirements, works definitions, timeliness, government bureaucracy, and risk assessment. with a total design and construct value of over $2.0 billion found 22 specific causes of time overrun. Weather, industrial disputation, client scope changes and variations, and Consultant problems were some of the ones occurring with the highest frequency.

Kaming (1997), on a similar study for overruns on high-rise projects in Indonesia established that, plant usage, resource estimates and human resource shortage influenced delays while environment, cost data, and inflation were significant in determining the cost overrun.

4.3 CAUSES OF DELAY

Kumaraswamy and Chan (1998) on causes of construction delays in Hong Kong found differences in perceptions as to causes of delays by different groups of participants in building and civil engineering works

They suggested that biases of different industry groups might direct blame for delays to other groups. Noulmanee et al(1999). investigated causes of delays in highway construction in Thailand and concluded that delays can be caused by all parties involved in projects; however, main causes come from

Inadequacy of sub-contractors,

Organizations that lack sufficient resources,

Incomplete and unclear drawings and deficiencies between consultants and contractors.

Al-Momani (2000) investigated causes of delay in 130 public projects in Jordan and found that main causes of delay were related to designer, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity.

Al-Kharashi and Skitmore (2008) point out that the main cause of delay in Saudi Arabia c A study by Ahmed, Azhar, Castillo and Kappagantula, (2002) identified ten most critical causes in Florida as building permits approval, change order, changes in drawings, incomplete documents, inspections, changes in specifications, decision during development stage and shop drawings and approval. Construction sector for public projects is the lack of qualified and experienced personnel.

Sambas van and Soon (2007) identify ten most important causes of delay in Malaysian construction industry contractor's improper planning, contractor's poor site management, inadequate contractor experience, inadequate client's finance and payments for completed

work, problems with subcontractors, shortage in material, labor supply, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage.
. Chan and Kumaraswamy (1997) identified five principal delay factors which are:
Poor risk management and supervision,
Unforeseen site conditions,
Slow decision making,
Client-initiated variations and work variations.

Other delay factors in a study by Kaming, Olomolaiye, Holt and Harris (1997) are classified under cost and time overruns. The study reveals that the major factors influencing cost overrun are:
Material cost increase due to inflation inaccurate material estimation and degree of complexity. On the other hand, under time overrun, the most important factors causing delays are: design changes, poor labor productivity, inadequate planning, and resource shortages.
Haseeb, Xinhai-Lu, Bibi, Maloof-ud-Dyian, and Rabbani (2011) point out that the most common factors of delay are natural disaster in Pakistan like flood and earthquake. The study also acknowledged others which are: financial and payment problems, improper planning, poor site management, insufficient experience, and shortage of materials and equipment.
In Ethiopia researches conducted in this regard;
Girmay Kassay(2003). In master thesis; Claims in international Projects in Ethiopia; Case Study; indicated causes for delay as; Design Change and Structural related issues, Adverse Weather Condition, Payment Delay; Variation; Interruption of works at Taxiway Junction with the Exiting Runway.
As cited above clearly the cause for delay in different countries vary but the common causes for delay related with; Poor risk management and supervision, Unforeseen site Conditions, Slow decision making, Client-initiated variations and work variations. In Ethiopian the most common causes of delay on a project include: differing site conditions; changes in requirements or design; weather; unavailability of labor, material or equipment; defective plans and specifications; and interference by the owner. Such delays will often force a contractor to extend its schedule to complete the work required under the contract, as well as to incur additional costs in the performance of site work. and additional cost to rectify. These costs however, are built into the initial bid and will be absorbed without affecting the time frame or budget. Despite this however, it is possible to drastically underestimate the costs of such 'normal' mistakes. Outside of these usual estimates, there are a number of disruption costs that should be automatically factored into contracts but that are in most cases overlooked by both the contractor and the employer. There are other types of disruptions that can be significant in their impact and are rarely thought about during original estimating. When these types of disruption do occur, their consequences can be underestimated as they are often seen by the contractor as aberrations with an

expectation that their consequences can be controlled and managed. It is noted that the danger of estimates missing the link between risk assessment and risk as potential triggers for disruption. It is common for employers to interfere with the flow of construction. For example, an employer could easily give back a larger than expected number of comments on design than a contractor expected, requiring additional drawings to be reworked. These comments, made by the employer, could just as easily be made by the contractor's own engineers. In either case, the extra time taken for the drawings will have to be made up by taking mitigating action elsewhere on the project, and this will have an impact on the overall feedback on the project from the employer. One of the most common causes of disruption is a variation or change order, coming from the employer, and amending what the contractor is required to do, or what the project is required to deliver. This can occur even after work has commenced. Variations can also occur as a result of the contractors themselves however. This frequently occurs during complex projects because of the excitement that certain solutions might generate within the contractor's own staff. For example, when a complex problem gives rise to a novel or unique solution, not infrequently will a contractor approve such a solution even though it is costlier than the solution provided for in the original plans. It is also possible that the contractor and employer have interpreted the plans differently, and so the requirement changes when the contractor becomes aware of the discrepancy and changes the plan to meet the employer's interpretation.

CHAPTER THREE
TIME & PROGRAM

3.1. CONCEPT OF TIME AND ITS MANAGEMENT IN CONSTRUCTION PROJECTS

3.1.1. Project

A project is temporary in that it has a defined beginning and end in time, and therefore defined scope and resources. And a project is unique in that it is not a routine operation, but a specific set of operations designed to accomplish a singular goal. It is a temporary endeavor undertaken to create a unique product, service, or result. The end is reached when the project's objectives have been achieved or when the project is terminated because its objectives will not or cannot be met, or when the need for the project no longer exists. A project may also be terminated if the client (customer or sponsor) wishes to terminate the project. Temporary does not necessarily mean the duration of the project is short. It refers to the project's engagement and its longevity. Temporary does not typically apply to the product, service, or result created by the project; most projects are undertaken to create a lasting outcome. Project management is the application of knowledge, skills, tools, and techniques to project activities to meet the project requirements. Project management is accomplished through the appropriate application and integration of logically grouped project management processes, which are categorized into five Process Groups. These Five Process Groups are:

Initiating,
Planning,
Executing,
Monitoring and Controlling, and
Closing.

Managing a project typically includes, but is not limited to:

Identifying requirements;
Addressing the various needs, concerns, and expectations of the stakeholders in planning and executing the project;
Setting up, maintaining, and carrying out communications among stakeholders that are active, effective, and collaborative in nature;
Managing stakeholders towards meeting project requirements and creating project deliverables;
Balancing the competing project constraints, which include, but are not limited to: -
Scope,
Quality
Schedule,
Budget,
Resources and - Risks.

The specific project characteristics and circumstances can influence the constraints on which the project management team needs to focus.

3.1.2 Construction Project

Construction is the process of creating and building infrastructure or a facility. It differs from manufacturing in that manufacturing typically involves mass production of similar items without a designated purchaser and construction is typically done on location for a known client. Construction as an industry is six to nine percent of the productive developed countries and thirty to forty percent to developing countries. Construction starts with planning, design, and financing and continues until the project is built and ready for use In general, there are three sectors of construction: buildings, infrastructure and industrial. Building construction is usually further divided into residential and non-residential (commercial/institutional). Infrastructure is often called heavy/highway, heavy civil or heavy engineering. It includes large public works, dams, bridges, highways, water/wastewater and utility distribution. Industrial includes refineries, process chemical, power generation, mills and manufacturing plants. There are other ways to break the industry into sectors or markets.

3.1.3 Definition of Time

Time with its associated costs are vitally important for each participant in the construction process including the lender, owner, architect engineers, contractors and subcontractors as well as these who provide bonding and insurance coverage. Together with cost and quality, it is a

primary objective of project is judge. The scope of this subject may be seen on the date of possession of the site shall be given to the contractor who shall there up on begin the works regularly and diligently proceed with the same and shall complete the same on or before the completion date.

This identifies the three basic time related issues such as commencement date, project duration and progress and completion. In fact, there are also two other issues: the contractor's continuing obligation after completion and the extensions of time which may be available to the contractor when the work is delayed certain specified cause. Timing is often defined by means of a programmed, showing graphically the order in which certain activities will take place and their durations in order to meet contractual deadlines. Under the FIDIC forms of contract for works, such programmed are not included as contract documents. This is because the FIDIC forms of contracts were originally based on an English form and under English law, if a programmed is included as part of the contract, it must be followed precisely. In other words, if either party deviates from the programmed, that party will be in breach of the contract. In view of the fact that the main purpose of a programmers' to serve as a working tool that allows the parties to see how adjustments can be made to the organization of activities in order to recover lost time or otherwise, it is generally viewed as bad practice to rigidly impose every detail of the programmed as a binding contractual requirement.

3.1.4 Management of Time/Management Tools The construction process is a complex undertaking. It involves many different activities and participants from initial planning through execution. The requisite tasks, and the roles and responsibilities of the owner, architect engineers, construction managers, contractors, and subcontractors can be organized in a number of different ways to deliver a construction project. Despite these many options, building a major construction project today without experiencing schedule delays and cost overruns is often the exception. While there are many factors that can contribute to these poor results, there are two key success factors: effectively managing time and change. Effective management and the administration of the contract time and change provisions are central to the avoidance and mitigation extended time and cost overruns. To enhance the odds of a successful project outcome, it is essential for participants in the construction process to have a basic understanding of:

Critical path scheduling techniques, the associated scheduling specifications, and the software involved.

Delay and how it occurs.

The pros and cons of various schedule and delay methodologies being used by project participants and experts.

The foundational principles for any successful schedule and delay analysis methodology.

Managing the time factor can be expensive, burdened with pressures, and subject to much uncertainty. Key factors having an influence on successful project delivery include the use of overly complex scheduling specifications, construction brokering by the contractor, errors and omissions, differing site conditions, user changes, and inadequate time extensions. These can be compounded by reservation of rights for delay, cumulative impacts, and ignoring possible completion date waivers. Further, there is still uncertainty and misunderstanding that remains in terms of what constitutes acceptable standards of proof for excusable delay and impacts. While computers and scheduling software have greatly increased the potential for enhanced scheduling capabilities, they have also contributed to a variety of user quality problems. The situation is often compounded by failure of both the Owner and Contractor to recognize from the start the need for timely resolution of delays and keeping the schedule up to date by reflecting actual performance and delays as they occur.

3.1.4.1 Commencement Date

Specified in the award of a contract, it is the date when the contractor must begin the work on the site. Contracted date when activities begin. When actions begin pertaining to a contract. A contractor must begin work on a projection the commencement date. The Date of Commencement of a contract is often the subject of disputes in Construction and it is recommended that a commencement date be agreed upon between concerned parties as soon as possible. This date could be critical for the evaluation of the contract completion date, Extensions of Time, prolongation costs, maintenance period, release of retention and many others.

3.1.4.2 Possession of site An employer who fails to give the contractor possession of the site may be liable to pay damages for breach of contract. This is to despite provision in the contract for the contract administrator to postpone all or any part of the works, since it seems that such provision may not be used to postpone the entire project. However, the employer is not deemed to guarantee possession and will therefore not be liable if the contractor is prevented from gaining access by some third party, such as unlawful pickets, over whose activities the employer has no control. Most buildings contract will name a date on which the contractor is to be given possession of the site, after which the contractor may commence the works. If possession is not the given on the date specified, the employer will lose the right to recover the liquidated damage from the contractor in the event of late completion. If no date is specified from the outset it is for the engineer to notify the contractor of the date for commencement of the works. This notice must be given in writing and the date itself must be between 14 and 28 days of the award of the contract. If the contract contains no specific commencement provision, then the contractor must be given possession at such a time as will enable the work to be completed by the completion of date. The contractor is not obligated to start work on the date for possession as such; however, a contractor who does not start reasonably quickly may be reliable for not proceeding regularity and diligently (JCT98) or without delay.

3.1.4.3 Completion Date

Most contracts set a date by which the works described in the contract must be completed. This is not the date by which all obligations under the contract have to be discharged, but the date by which 'practical completion' must be certified. That is, the date by which the works have been completed and the client can take possession of the site. Certifying practical(referred to as 'substantial completion' on some forms of contract) returns possession of the site to the client, releases half of the retention, ends the contractor's liability for damages and signifies the beginning of the defects liability period. The defects liability period (sometimes called the rectification period) typically lasts six to twelve months during which the client may occupy the premises and the contractor must rectify any defects that are identified.

The date may be altered during the course of the contract, for example if the date the contractor takes possession of the site to begin construction is delayed, or if a time granted due to delays to the works that are not the contractor’s fault. Completion therefore must be certified by the most recently agreed date. If completions not certified by the most recently agreed completion date, then the contractor may be liable to pay damages to the client. These are predetermined damages set at the time that the contract is entered into, based on a calculation of the actual loss that the clients likely to incur if the contractor fails to meet the completion date. Some contracts require that a no completions issued as a pre-requisite to deducting damages. Where the contract requires completion of the works, then separate dates for completion and separate rates of damages should be set for each section. Note that there can be effect, where delays in

one section cause delays in another. The contractor may then be liable to pay damages for each section. On management contracts, a separate date must be set for each trade contract. Once all contract shave been certified as practically complete, the construction manager issues a certificate or project completion. The same is true on management contracts, where each contract must be dealt with individually.

Documentation that should be issued to the client on certification of completion may include:

A draft manual

As built Drawings

A building user's guide.

The health and safety file.

The building log book.

A construction stage report.

Notes site book

If a contract does not specify a completion date, then the works should be completed within a reasonable time, although it is unlikely that such an ambiguous arrangement would allow the client to deduct liquidated and ascertained damages.

Contracts will generally include a provision requiring that the contractor proceeds 'regularly and diligently' irrespective of whether it is apparent that the date will be achieved.

3.1.4.4. Time at large

Contracts will usually include a date by which the works described in the contract should be completed. This is generally the date by which completion must be certified. The phrase 'time at large' describes the situation where there is no date for completion, or where the completion has become invalid. The contractors then no longer bound by the obligation to complete the works by a certain date. In commercial contracts the parties usually intend the works to be completed by an agreed date. In many contracts the date for completion will be stated as an express term. The term Time at Large is not a legal term, but describes the situation where there is no identified date for completion, either by absence from the contract terms or arising from events and the operation of law. Time is said to be at large because the time or date for completion is not fixed before carrying out the work, but determined after the work has been completed. The term Time at Large is usually used in construction contracts in the situation where liquidated damages are an issue. If time is at large then it is argued liquidated damages cannot be applied, because there is no date fixed from which the liquidated damages can be calculated. In some situations, the date for completion may be relevant to termination and the issue whether or not there has been a breach of contract by failure to complete.

Time is made at large in four situations. No time or date is fixed by the terms of the contract by which performance must take place or be completed.

The time for performance has been fixed under the contract, but has ceased to apply either by agreement or by an act of prevention (which includes instructed additional work) or breach of contract by the Employer with no corresponding entitlement to extension of time.

The Employer has waived the obligation to complete by the specified time or date. An alternative situation is that the Employer is faced with a breach of contract by the contractor which would entitle to Employer to terminate the employment of the contractor and/or to bring to an end the primary obligations of the parties to perform, but instead elects to continue with the performance of the contract.

The Employer has interfered in the certification process to prevent proper administration of the contract.

3.1.4.5 No time

Completion on time is important in modern construction contracts. If the project is late the Employers return on his investment is reduced and the Contractors costs frequently increased. Many construction contracts and Standard Forms of contract usually place an obligation on the contractor to complete the works by a specified completion date or within a specified period.

If no date or period is fixed by the contract, then the objective intention of the parties must be ascertained. In the case of a contract under the Supply of Goods and Services Act 1982, if the date is not fixed by a course of dealing between the parties, a term will be implied that the contractor's obligation is to complete within a reasonable time.

3.1.4.6 Extension of Time

Many contracts allow the construction period to be extended where there are delays that are not the contractor's fault. This is described as an extension of time (EOT). When it becomes reasonably apparent that there is a delay, or that there is likely to be a delay that could merit an extension of time, the contractor gives written notice to the administrator identifying the event that has caused the delay. If the administrator accepts that the delay was caused by a relevant event, then they may grant an time and the dates adjusted.

Events may include:

Variations.
Exceptionally adverse weather.
Civil commotion or terrorism.
Failure to provide information.
Delay on the part of a nominated sub-contractor.
Statutory undertaker's work.
Delay in giving the contractor possession of the site.
Force majeure (such as an epidemic or an 'act of God').
Loss from a peril such as flood.
The supply of materials and goods by the client.

Strikes.

Changes in statutory requirements.

Delays in receiving permissions that the contractor has taken reasonable steps to avoid.

The contractors required to prevent or mitigate the delay and any resulting loss, even where the fault is not their own.

Assessing claims for a time can be complicated and controversial. There may be multiple or concurrent delays, some of which are the contractor's fault and some not. There are many occasions where contractors contribute to delay themselves by their performance during design periods, when producing drawings, mock ups and samples or in inter-facing with subcontractors. Crucial in assessing applications for times the quality of the information provided and records available. All claims should be judged against the progress of the works and not the program and must demonstrate the link between the breach (cause) and the delay. Supplemental and wrap-up agreements previously agreed by both parties can weaken the contractor's final entitlement. The administrator may review time after completion and further adjust the completion date. Mechanisms allowing time are not simply for the contractor's benefit. If there was no such mechanism and a delay occurred which was not the contractor's fault, then the contractor would no longer be required to complete the works by the date and would only then have to complete the works in a 'reasonable' time. The client would lose any right to liquidated damages.

Claims for time can run alongside claims for loss and expense(relevant matters) however, one need not necessarily lead to the other.

3.1.6 Regulation of Time under MDB-FIDIC (2006), PPA (2011) &Other Applicable laws

3.1.6.1 Time under MDB-FIDIC (2006)

Construction contracts are governed by the general law of contract; there are in addition some statutory rules, on payment and the settlement of disputes, which apply only to construction contracts. Under this topic we focus on time with regard to the MDB FIDIC conditions and examine the way in which general principles applied in the construction contract.

Clause 1.9 Delayed Drawings or Instructions

States the Contractor shall give notice to the Engineer whenever the Works are likely to be delayed or disrupted. The notice shall include details of the necessary drawing or instruction

If the Contractor suffers delay and/or incurs Cost as a result of a failure of the Contractor shall give a further notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to: an extension of time, under Sub-Clause 8.4 [Extension of Time for Completion], and

Payment of any such Cost plus profit, in accordance with Sub- Clause 3.5 [Determinations] to agree or determine these matters.

Clause 2.1 Right of Access to the Site

The Employer shall give the Contractor right of access within the time (or times) stated in the Contract Data.

If no such time is stated in the Contract Data, the Employer shall give the Contractor right of access to, and possession of, the Site within such times as required to enable the Contractor to proceed without disruption in accordance with the program submitted under Sub-Clause 8.3 [Program]. If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall give notice to the Engineer and shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to:

an extension of time for any such delay, under Sub-Clause 8.4 [Extension of Time for Completion], and Payment of any such Cost plus profit, which shall be included in the Contract Price.

Clause 8 Commencements, Delays and Suspension

The MDB FIDIC consider the following issues covered in the sub clause with related to time which are interrelated with other clauses

Commencement of Works
Times for Completion
Programs
Extension of Time for Completion
Delays Caused by Authorities
Rate of Progress
Delay Damages
Suspension of Work
Consequences of Suspension

Payments for Plant and Materials in Event of Suspension

Prolonged Suspensions

Resumption of Work

1. Commencement of Works

The Commencement Date shall be the date at which the following precedent conditions have all been fulfilled and the Engineer's instruction signature of the Contract Agreement by both Parties, and if required, approval of the Contract by relevant authorities of the Country;

delivery to the Contractor of reasonable evidence of the Employer's Financial arrangements (under Sub-Clause 2.4 [Employer's Financial Arrangement]);

except if otherwise specified in the Contract Data, and possession of the Site given to the Contractor together with such permission(s) under (a) of Sub-Clause 1.13 Compliance with Laws] as required for the commencement of the Works;

Receipt by the Contractor of the Advance Payment under Sub-Clause 14.2 Advance Payment] provided that the corresponding bank guarantee has been delivered by the Contractor. If the said Engineer's instruction is not received by the Contractor within 180 days from his receipt of the Letter of Acceptance, the Contractor shall be entitled to terminate the Contract under Sub Clause 16.2 [Termination by Contractor]. The Contractor shall commence the execution of the Works as soon as is reasonably practicable after the Commencement Date, and shall then proceed with the Works with due expedition and without delay

2. Times for Completion

The Contractor shall complete the whole of the Works, and each Section (if any), within the Time for Completion for the Works or Section (as the case may be), including: achieving the passing of the Tests on Completion, and completing all work which is stated in the Contract

Under Sub-Clause 10.1 [Taking Over of the Works and Sections

3. Programs

The Contractor shall submit a detailed time program to the Engineer within 28 days after receiving the notice under Sub-Clause 8.1 [Commencement of Works Program shall include:

the order in which the Contractor intends to carry out the Works, including the timing of each stage of design (if any), Contractor's Documents, procurement, manufacture of Plant, delivery to Site, construction, erection and testing,

each of these stages for work by each nominated Subcontractor (as defined in Clause 5 [Nominated Subcontractors],

the sequence and timing of inspections and tests specified in the Contract, and a supporting report which includes:

general description of the methods which the Contractor intends to adopt, and of the major stages, in the execution of the Works, and

Details showing the Contractor's reasonable estimate of the number of each class of Contractor's Personnel and of each type of Contractor's Equipment, required on the Site for

each major stage. Unless the Engineer, within 21 days after receiving a program, gives notice to the Contractor stating the extent to which it does not comply with the Contract, the Contractor shall proceed in accordance with the program, subject to his other obligations under the Contract. The Employer's Personnel shall be entitled to rely upon the program when planning their activities.

The Contractor shall promptly give notice to the Engineer of specific probable future events or circumstances which may adversely affect the work increase the Contract Price or delay the execution of the Works. The Engineer may require the Contractor to submit an estimate of the anticipated effect of the future event or circumstances, and/or a proposal under Sub-Clause 13.3 [Variation Procedure].

4. Extension of Time for Completion

The Contractor shall be entitled subject to Sub-Clause 20.1 [Contractor's Claims] to an extension of the Time for Completion if and to the extent that completion for the purposes of Sub-Clause 10.1 [Taking-Over of the Works and Sections] is or will be delayed by any of the following causes:

Variation or other substantial change in the quantity of an item of work included in the Contract,

a cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,

Exceptionally adverse climatic conditions,

Unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions, or

Any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel or the Employer's other contractors.

If the Contractor considers himself to be entitled to an extension of the Time for Completion, the Contractor shall give notice to the Engineer in accordance with Sub-Clause 20.1 [Contractor's Claims]. When determining each extension of time under Sub-Clause 20.1, the Engineer shall review previous determinations and may increase, but shall not decrease, the total extension of time.

5. Delays Caused by Authorities

If the following conditions apply, namely: the Contractor has diligently followed the procedures laid down by the relevant legally constituted public authorities in the Country,
These authorities delay or disrupt the Contractor's work, and
The delay or disruption was Unforeseeable, and then this delay or disruption will be considered as a cause of delay under subparagraph (b) of Sub-Clause 8.4 [Extension of Time for Completion].

6 Rate Progress

If at any time actual progress is too slow to complete within the Time for Completion, and/or progress has fallen (or will fall) behind the current program under Sub-Clause8.3 [Program], other than as a result of a cause listed in Sub-Clause 8.4 [Extension of Time for Completion], then the Engineer may instruct the Contractor to submit, under Sub- Clause 8.3 [Program], a revised program and supporting report describing the revised methods which the Contractor proposes to adopt in order to expedite progress and complete within the Time for Completion.
Unless the Engineer notifies otherwise, the Contractor shall adopt these revised methods, which may require increases in the working hours and/or in the numbers of Contractor's Personnel and/or Goods, at the risk and cost of the Contractor. If these revised methods cause the Employer to incur additional costs, the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] pay these costs to the employer, in addition to delay damages (if any) under Sub-Clause 8.7. Additional costs of revised methods including acceleration measures, instructed by the Engineer to reduce delays resulting from causes listed under Sub-Clause 8.4 [Extension of Time for Completion] shall be paid by the Employer, without generating, however, any other additional payment benefit to the Contractor.

7. Delay Damages

If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], the Contractor shall subject to notice under Sub-Clause 2.5 [Employer's Claims] pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, which shall be paid for every day which shall elapse between the relevant Time for Completion and the date stated in the Taking-Over Certificate. However, the total amount due under this Sub-Clause shall not exceed the maximum amount of delay damages (if any) stated in the Contract Data.
These delay damages shall be the only damages due from the Contractor for such default, other than in the event of termination under Sub-Clause 15.2 [Termination by Employer] prior to completion of the Works. These damages shall not relieve the Contractor from his obligation to complete the Works, or from any other duties, obligations or responsibilities which he may have under the Contract.

8. Suspension of Work

The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage. The Engineer may also notify the cause for the suspension. If and to the extent that the cause is notified and is the responsibility of the Contractor, the following Sub-Clauses 8.9, 8.10 and 8.11 shall not apply.

9 .Consequences of Suspension

If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions under Sub-Clause 8.8 [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to

Sub-Clause 20.1 [Contractor's Claims] to:

an extension of time for any such delay, if completion is or will be delayed, under Sub Clause 8.4 [Extension of Time for Completion], and

Payment of any such Cost, which shall be included in the Contract Price. After receiving this notice, the Engineer shall proceed in accordance with Sub-Clause 3.5 [Determinations] to agree or determine these matters. The Contractor shall not be entitled to an extension of time for, or to payment of the Cost incurred in, making good the consequences of the Contractor's faulty design, workmanship or materials, or of the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.8 [Suspension of Work].

10 .Payments for Plant and Materials in Event of Suspension

The Contractor shall be entitled to payment of the value (as at the date of suspension) of Plant and/or Materials which have not been delivered to Site, if:

the work on Plant or delivery of Plant and/or Materials has been suspended for more than 28 days, and

The Contractor has marked the Plant and/or Materials as the Employer's property in accordance with the Engineer's instructions.

11 .Prolonged Suspensions

If the suspension under Sub-Clause 8.8 [Suspension of Work] has continued for more than 84 days, the Contractor may request the Engineer's permission to proceed. If the Engineer does not give permission within 28 days after being requested to do so, the Contractor may, by giving notice to the Engineer, treat the suspension as an omission under Clause 13 [Variations and Adjustments] of the affected part of the Works. If the suspension affects the whole of the Works, the Contractor may give notice of termination under Sub-Clause 16.2 [Termination by Contractor].

12. Resumption of Work

After the permission or instruction to proceed is given, the Contractor and the Engineer shall jointly examine the Works and the Plant and Materials affected by the suspension. The Contractor shall make good any deterioration or defect in or loss of the Works or Plant or Materials, which has occurred during the suspension after receiving from the Engineer an instruction to this effect under Clause 13 [Variations and Adjustments].

3.1.6.2 Time under PPA (2011) conditions of Contract

The Federal Democratic Republic of Ethiopia has prepared the Standard Bidding Document (SBD) or Procurement of Works for International Competitive Biddings (ICB hence the General Conditions of Contract is covered under Section 7. The Public Body is the Contracting Authority for this procurement process and it is bound by the rules governing public procurement in the Federal Democratic Republic of Ethiopia. It has the powers and duties to conclude a Contract for the provision of Works. Accordingly, this procurement process is being conducted in accordance with the recent editions of the Ethiopian Federal Government Procurement and Property Administration Proclamation and Public Procurement Directive under the procurement method and named PPA2011. (PPA 2011 SBD)

Suspension

Clause 20 Refers suspension and described under the sub clause 20.1 and 20.5 as follows;

The Contractor shall, on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may necessary.

If the period of suspension exceeds 120 days and the suspension is not due to the Contractor's default, the Contractor may, by notice to the Engineer, request permission to proceed within thirty (30) days or terminate the contract.

Termination

Termination by the Public Body

Termination shall be without prejudice to any other rights or powers under the contract of the Public Body and the Contractor.

In addition to the grounds for termination defined in these General Conditions, the Public Body may, by not less than thirty days' written notice of termination to the Contractor stating the reason for termination of the contract and the date on which such termination becomes effective. (except in the event listed in paragraph (o) below, for which there shall be a written notice of not less than sixty days), such notice to be given after the occurrence of any of the events specified in this GCC Sub-Clause 21.2 (a) to (p), terminate the Contract as stated here under if:

Termination by the Contractor

The Contractor may, by not less than thirty (30) days' written notice to the Public Body, of such notice to be given after the occurrence of any of the events specified in GCC Sub-Clause

21.3 (a) to (d) terminate the Contract if: The Public Body fails to pay any money due to the Contractor pursuant to the Contract and not subject to dispute pursuant to Clause 25, within forty-five (45) days after receiving written notice from the Contractor that such payment is overdue as stated here under; Clause 27 Liquidated Damages

Clause 27.1 states; Except as provided under GCC Clause 18, if the Contractor fails to carry out any or all of the Works within the period specified in the Contract, the Public Body may without prejudice to all its other remedies under the Contract, deduct from the Contract Price, as liquidated damages the following:

A penalty of 0.1% or 1/1000 of the value of undelivered Service for each day of delay until actual delivery or performance,

The cumulative penalty to be paid by the Contractor shall not exceed 10% of the contract price.

Clause 27.2 states if the delay in performing the contract affects its activities, the Public Body may terminate the contract by giving advance notice to the Contractor pursuant to GCC Clause 21 without any

Clause 41 Program of Implementation of Tasks

Completing the work program given as part of the Bid, the Contractor shall within the time stated in the SCC provide the Engineer with a program of implementation of the tasks, broken down by activity and by month and include the following information:

The order in which the Contractor proposes to carry out the works;

The time limits within which submission and approval of the drawings are required;

An organization chart containing the names, qualifications and curricula vitae of the staff responsible for the Site,

A general description of the method including the sequence, by month and by nature which the Contractor proposes to carry out the works;

A plan for the setting out and organization of the Site, and

Such further details and information as the Engineer may reasonably require.

Clause 71 Commencement of Works

Clause 71.1The Public Body shall fix the Start Date on which execution of the Works is to commence in the SCC or by administrative order issued by the Engineer.

Clause 71.2The Start Date for commencing execution of the Works shall be not later than 120 days following notification of award of contract unless agreed otherwise by the parties.

Clause 72 Period of Execution of Works

Clause 71.1 the period of execution of Works shall commence on the Start Date fixed in accordance with GCC Clause 71.1 and shall be as laid down in the SCC, without prejudice to extensions of the period which may be granted under GCC Clause 73.

Clause 71.2 The Contractor shall carry out the Works in accordance with the Program of implementation of tasks submitted by the Contractor, as updated with the approval of the Engineer, and complete them by the Intended Completion Date.

Clause 71.3 if provision is made for distinct periods of implementation for separate lots, in cases where one Contractor is awarded more than one lot per contract, the periods of implementation for the separate lots will not be accumulated. Clause 73 Extension of Intended Completion Date

The Contractor may request an extension of the Intended Completion Date if he is or will be delayed in completing the contract by any of the following causes:

Exceptional weather conditions in the Federal Democratic Republic of Ethiopia;

Artificial obstructions or physical conditions which could not reasonably have been foreseen by an experienced Contractor;

Compensation Event occurs or a change order for modification is issued which makes it impossible for completion to be achieved by the Intended Completion Date;

Administrative orders affecting the date of completion other than those arising from the Contractor's default;

Failure of the Public Body to fulfill his obligations under the Contract;

Any suspension of the works which is not due to the Contractor's default; Force majeure;

Any other causes referred to in these GCC which are not due to the Contractor's default.

The Contractor shall, within 15 days of becoming aware that delay may occur, notify the Engineer of his intention to make a request for extension of the Intended Completion Date to which he may consider himself entitled, and shall, unless otherwise agreed between the Contractor and the Engineer, within 21 days from the notification deliver to the Engineer full and detailed particulars of the request, in order that such request may be investigated at the time. 3 Within 21 days from receipt of the Contractor's detailed particulars of the request, the Engineer shall, by written notice to the Contractor after due consultation with the Public Body and, where appropriate, the Contractor, grant such extension of the Intended Completion Date as may be justified, either prospectively or retrospectively, or inform the Contractor that he is not entitled to an extension. 4. If the Contractor has failed to give early notification of a delay or has failed to cooperate in dealing with a delay, the delay by this failure shall not be considered in assessing the new Intended Completion Date. Clause 74 Compensation Events for Allowing Time Extension Clause 74.1 the following shall be Compensation Events allowing for time extension:

The Public Body does not give access to a part of the Site by the Site Possession Date stated in the Contractor’s approved work program;

The Public Body modifies the Schedule of other Contractors in a way that affects the work of the Contractor under the Contract;

The Engineer orders a delay or does not issue Drawings, Specifications, or instructions required for execution of the Works on time;

The Engineer instructs the Contractor to uncover or to carry out additional tests upon work, which is then found to have no Defects;
The Engineer unreasonably does not approve a subcontract to be let;
The Engineer gives an instruction for dealing with an unforeseen condition, caused by the Public Body, or additional work required for safety or other reasons.
Other Contractors, public authorities, utilities, or the Public Body do not work within the dates and other constraints stated in the Contract, and they cause delay;
The advance payment is delayed;
The Engineer unreasonably delays issuing Interim Payment Certificates;
Other Compensation Events described in the SCC or determined by the Public Body and force majeure.
Clause 74.2 if a Compensation Event would prevent the work being completed before the Intended Completion Date, the Intended Completion Date shall be extended. The Engineer shall decide whether and by how much the Intended Completion Date shall be extended.

3.1.6.3 Time under other applicable laws

Time under the civil code

The civil code describe contract in General as follows
Art. 1675 Defines: A contract is an agreement whereby two or more persons as between themselves create, vary or extinguish obligations of a proprietary nature.
Art. 1690. - Offer with time limit for acceptance
Whenever offers to another to enter into a contract and fixes a time limit for acceptance shall be bound by his offer until the time limit fixed expires.
He shall not be bound where his offer is rejected before the expiry of the time limit fixed. **Art. 1691**. - Offer without time limit.
Whenever offer to another to enter into a contract and does not fix any time limit shall be bound by his offer until the time when he can reasonably expect the other party to decide or the offer.
Where acceptance is late, the offering party shall forthwith inform the other party where. He does not intend to be bound.
Art. 1756. -- Time of payment.
Payment shall be made at the agreed time.
Where no time is fixed in the contract, payment may be made forthwith.
Payment shall be made whenever a party requires the other party to perform his obligations.
Cancellation of contract by the Court.
A party may move the court to cancel the contract where the other party has not or not fully and adequately performed his obligations within the agreed period of time.
Art. 1787. - 2. Expiry of time limit.

A party may cancel the contract where -the other party has failed to perform his obligations within the period of time fixed in accordance with Art. 1770, 1774 or 1775

Art. 1819. - Consent of the parties.

A contract may terminate where the parties so agree.

A contract which is terminated shall no longer be performed.

Termination shall have no retrospective effect.

Art. 1821. - Contracts for an undefined period of time.

Where a contract is made for an undefined period of time, both parties may terminate it on notice.

Art. 1857. - Calculation of period of time.

Where an obligation is to be discharged or another act of legal nature is to be performed after a certain period of time from the date of the contract or any other date, such period shall be reckoned in accordance with the provisions of the following Articles.

Art. 1858. - Period fixed in days.

Where the period is fixed in days, the date shall be due on the last day of such period, the day of the making of the contract not being included.

Art. 1859. - Period fixed in weeks.

Where the period is fixed in weeks, the debt shall be due on such day of the last week as corresponds by its name to the day of the making of the contract.

Art. 1860. - Period fixed in months.

Where the period is fixed in months or so as to include several months, the debt shall be due on such day of the last month as corresponds by its number to the day of the making of the contract. Where the period is fixed in accordance with the Gregorian calendar and no day in the last t month corresponds to the day of the making of the contract. The debt shall be due on the last day of the last month.

The thirteenth month of the Ethiopian Calendar shall not be taken into account.

Art. 1861. - Monthly periods.

Where the period expires at the beginning or at the end of a month, such period shall expire on the first or on the last day of such month.

Where the period expires in the middle of a month, such period shall expire on the fifteenth of such month.

Art. 1862. Holidays.

Where the period expires on a day which is a holiday at the place of payment, such period shall expire on the next working day.

Art. 1863. - Lapse of time.

Where an obligation is to be discharged within a specified period of time, the debtor shall discharge his obligations before the expiry of such period.

He shall fix the exact date on which he shall discharge his obligations unless the circumstances are such as to show that the said date is to be fixed by the creditor.

Art. 1864. - Period extended.

Where the period is extended, the new period shall, unless otherwise agreed, begin to run from the day following the day on which the time period expired.

Art. 1865. - Benefit of period of time.

The period of time shall be deemed to be fixed for the benefit of the debtor unless the contract or the circumstances show that it is also fixed for the benefit of the creditor.

Art. 1866. - Giving of benefit of time.

The debtor may discharge his obligations before the expiry of the agreed period of time unless the contrary intention of the parties can be inferred from the terms or nature of the contract or from the circumstances.

Payments made before the expiry of the agreed period of time may not be recovered.

Art. 2618. - Delay in execution of work.

Where the contractor delays the carrying out of his task so that it becomes evident that he cannot accomplish it in the time fixed in the contract, the client may fix him a reasonable time limit to begin the execution of the task.

Where the contractor, after this time limit, has not begun the task or has interrupted it in bad faith, the client may cancel the contract without waiting for the expiry of the period laid down for the completion of the task.

Where appropriate, the client may also claim, in such a case, damage from the contractor.

Art. 2619. - Where no time limit has been fixed.

Where no time limit has been fixed in the contract, the contractor shall immediately begin the execution of hi~ task and complete it within a reasonable time in accordance with custom.

The provision of Art. 2618 shall apply where the contractor does not immediately begin the carrying out of his task or where he interrupts it.

Art. 2620. - Defective execution of the task.

Where it appears, during the currency of the contract, that the task is being carried out in a defective manner or contrary to the contract, the client may fix a reasonable time limit for the contractor to put right the fault.

Where the contractor does not put the matter right within this time limit, in accordance with the rules of his profession and the contract, the client may cancel the contract without waiting, in order to assert his rights, the term provided for the completion of the task.

He may in addition claim damages from the contractor, where appropriate.

3174. - Time. - l. Principle.

Each contracting party shall perform his obligations within the time fixed by the contract.

Failing a specific provision in the contract, each contracting party shall perform his obligations within a reasonable time.

3.2 CONCEPT OF PROGRAM AND ITS MANAGEMENT IN CONSTRUCTION PROJECTS

3.2.1 Definition of program

Even though a program can be defined in terms of its context, a universal concept of its perception shall be defined as a planned, coordinated group of activities, procedures, etc., often for a specific purpose, or a facility offering such a series of activities: or a plan or schedule of activities, procedures, etc., to be followed. Many programs are concerned with delivering a capability to change. Only when that capability is transferred to the management and utilized by the host organization will the benefits actually be delivered. On this view, a program team cannot, on their own, deliver benefits. Benefits can only be delivered through the utilization of a new capability. Programs are normally designed to deliver the organization's strategy. A Program is a group of related projects managed in a coordinated manner to obtain benefits and control NOT available from managing them individually. Programs may include elements of related work outside of the scope of the discrete projects in the program... Some projects within a program can deliver useful incremental benefits to the organization before the program itself has completed.

3.2.2 Management of program

Program management is the process of managing several related projects, often with the intention of improving an organization's performance. In practice and in its aims it is often closely related to engineering and engineering. The program manager has oversight of the purpose and status of the projects in a program and can use this oversight to support project-level activity to ensure the program goals are met by providing a decision-making capacity that cannot be achieved at project level or by providing the project manager with a program perspective when required, or as a sounding board for ideas and approaches to solving project issues that have program impacts. The program manager may be well placed to provide this insight by actively seeking out such information from the project managers although in large and/or complex projects, a specific role may be required. However, this insight arises; the program manager needs this in order to be comfortable that the overall program goals are achievable. Program management also emphasizes the coordinating and prioritizing of resources across projects, managing links between the projects and the overall costs and risks of the program.

3.2.3 Construction Program Most construction contracts require the contractor to produce a program of works. This can be a non-contractual reference point for how work will be carried out or it can impose obligations to deliver the works in a certain way and by certain dates. Construction program is a vital document in due course of execution of a project. If the program of works is included in the list of contract documents, it will become binding on the parties. There are benefits and risks associated with doing that. As a minimum the program should specify the commencement date, the order in which the contractor plans to carry out the contract works and the planned completion date. The contract may stipulate other

information to be included in the program. A program will also be used as an indicative tool for the parties, suppliers and consultants for administering the progress of the works

Where the contract lists the program as a contract document, the program will be binding on the parties. Any departure from it will constitute a breach of contract entitling the aggrieved party to compensation if they can prove they have incurred additional costs or delay.

Employers primarily concerned with completing stages of the works by precise dates may be tempted to include the program in the list of contract documents. The advantage for the employer is that it will afford him greater control over the manner and order in which the contractor will carry out the works. It will allow him to specify the works that are a priority and oblige the contractor to prioritize the same matters.

The advantage for the contractor is that he will be aware of what is expected of him from the outset. The same applies to third parties, such as suppliers and consultants, who are often ignorant or left in limbo as to the timing of their own contributions to the works. Where this approach is adopted, the contract should clearly set out which part or parts of the program are binding. It could be that only the key milestone dates are binding. Conversely, it could be that all dates, the order of the works and the methods employed by the contractor are obligatory. Construction Management or Construction Project Management (CPMA) is the overall planning, coordination, and control of a project from beginning to completion. CPM is aimed at meeting a client's requirement in order to produce a functionally and financially viable project.

3.3. CORRELATION BETWEEN TIME AND PROGRAM

The concept of Time is broader than the program in construction projects in a sense that it being a frame work or parent to program. Program is described as the sequence in which tasks must be carried out so that a project (or part of a project) can be completed on a specified time. Time is the key input in carrying out a program from its start to execution. The development of programming tool has made easy management of time in due course of any project. A program is highly dependent on time whereby program uses inputs such as productivity and resources under pre specified time frame. Hence in its broader sense a program cannot exist without time but time can exist and function without a program. Both variables are in ter related to each other only to the extent of program being dependent on time. Program will often identify:

Dates and durations allocated to tasks.

A critical path (the sequence of critical tasks upon which the overall duration of the Program is dependent).

Tasks which can only be carried out after other tasks have been completed.

Tasks which can be carried out simultaneously.

'Float' within tasks that are not on the critical path (that is, delays that can be incurred without affecting the critical path). Identifying float can be helpful in highlighting where it may be possible to transfer resources to tasks that are on the critical path.

The need for specific resources such as plant, services or materials and their lead time.

CHAPTER FOUR
DELAY AND DELAY CLAIMS

4.1 DEFINITION OF DELAY

The term 'delay' is used to indicate that the works are not progressing, in the context of building contracts, as quickly as intended and, specifically, that as a result completion may not be achieved by the completion date specified in the contract documents. Most standard forms provide that the employer is entitled to deduct liquidated damages if the contractor does not achieve completion by the due date. In order to preserve the employer's right to deduct such damages; provision is also made for the contractor to be given extensions of time in certain circumstances.

The contractor's obligation to complete the works by the completion date is, like all such obligations, backed up by legal sanctions. Under certain types of contract (for example contracts for the sale of perishable goods), time is expressly or impliedly 'of the essence'. Where this is so, any lateness in performance entitled the other party to determine the contract. However, construction contracts very rarely fall into this category. Consequently, the employer's remedy for late completion will be an award of damages for breach of contract.

As to how such damages are to be measured, it is of course perfectly possible for the contract to say nothing, and to leave the assessment of the employer's loss (including any loss of profit) to an arbitrator or a court. However, it is standard practice in building and civil engineering contracts to state in advance what the damages shall be for delay, and this is usually done by specifying a fixed sum of money to be due for every day, week or month by which the contractor fails to meet the prescribed completion date. Such sums, which are called, liquidated damages, liquidated and ascertained damages

4.2 TYPES OF DELAY

4.2.1 Based on how they operate contractually

A) *Excusable compensable delays (E/C)* these are delays caused solely by the owner's action or inactions. These delay are not caused by the contractor and over which the contractors has no control, for example; variation, work suspension, delay in approvals, different site condition etc. this type of delay typically result in time extension, increased overhead expenses and perhaps profit and bond charges. In this case the contractor gets both a time extension & additional compensation.

B*) Excusable non compensable delays (E/N)* these are delays over which neither the owner nor the contractor has control.

Example; strikes, riots, exceptional adverse weather and majeure. This type of delays typically results in time extension but no increase in overhead expenses.

C) *Non excusable delays* These delays are caused by the sole action or inaction of the contractor (also known as culpable delays.) example; project mismanagement, insufficient workers and plants, delays in engineering / shop drawing production, failure to provide submitters in a timely manner etc. this type of delays typically result in neither time extension nor increase overhead expenses. The contractor shall be liable for the damages result from late completion as stipulated under the contract, or he shall pay for the acceleration damages to make up the lost time.

D) Concurrent delays It is the type of delay in which two or three of the stated delay occurs concurrently. The typical result to defer based on the type of delays. E.g. Excusable compensable delays (E/C) occur concurrently with non-excusable delays (N/N) the outcome will be typically time extension. I.e. reduction in late completion damages but no cost is associated with the delays.

4.2.2 Based on effect in the completion of projects. In simple words critical delays are those which cause delay to entire project completion date while non critical delays not necessarily affect the project completion date but affects progress. In all the projects delays are considered at the project completion date. Delays can be combination of small and big delays that occurred during the whole project therefore critical delays are taken more into consideration than non-critical delays.

4.3 CAUSES OF DELAY Construction

Projects are carried out within a specified time the scenario that calls for proper time management in particular eliminating all avenues of delays and disruptions.

A study by Kumaraswamy and Chan (1998) on causes of construction delays in Hong Kong found differences in perceptions as to causes of delays by different groups of participants in building and civil engineering works.

They suggested that biases of different industry groups might direct blame for delays to other groups. Noulmanee et al(1999) investigated causes of delays in highway construction in Thailand and concluded that delays can be caused by all parties involved in projects; however, main causes come from

Inadequacy of sub-contractors,

Organizations that lack sufficient resources,

Incomplete and unclear drawings and deficiencies between consultants and contractors. Al-Momani (2000) investigated causes of delay in 130 public projects in Jordan and found that main causes of delay were related to designer, user changes, weather, site conditions, late deliveries, economic conditions and increase in quantity.

Al-Kharashi and Skitmore (2008) point out that the main cause of delay in Saudi Arabia construction sector for public projects is the lack of qualified and experienced personnel. A study by Ahmed, Azhar, Castillo and Kappagantula, (2002) identified ten most critical causes in Florida

as building permits approval, change order, changes in drawings, incomplete documents, inspections, changes in specifications, decision during development stage and shop drawings and approval.

Sambasivan and Soon (2007) identify ten most important causes of delay in Malaysian construction industry contractor's improper planning, contractor's poor site management, inadequate contractor experience, inadequate client's finance and payments for completed work, problems with subcontractors, shortage in material, labor supply, equipment availability and failure, lack of communication between parties, and mistakes during the construction stage. Other researchers looked into delay factors in construction projects.

Chan and Kumaraswamy (1997) identified five principal delay factors which are:

Poor risk management and supervision,

Unforeseen site conditions,

Slow decision making,

Client-initiated variations and work variations.

Other delay factors in a study by Kaming, Olomolaiye, Holt and Harris (1997) are classified under cost and time overruns. The study reveals that the major factors influencing cost overrun are:

Material cost increase due to inflation,

Inaccurate material estimation and degree of complexity.

On the other hand, under time overrun, the most important factors causing delays are: design changes, poor labor productivity, inadequate planning, and resource shortages.

Haseeb, Xinhai-Lu, Bibi, Maloof-ud-Dyian, and Rabbani (2011) point out that the most common factors of delay are natural disaster in Pakistan like flood and earthquake. The study also acknowledged others which are: financial and payment problems, improper planning, poor site management, insufficient experience, and shortage of materials and equipment.

In Ethiopia researches conducted in this regard; GirmayKassay in master thesis;

Claims in international Projects in Ethiopia; Case Study; indicated causes for delay as; Design Change and Structural related issues, Adverse Weather Condition, Payment Delay; Variation; Interruption of works at Taxiway Junction with the Exiting Runway.

As cited above clearly the cause for delay in different countries vary but the common causes for delay related with; Poor risk management and supervision, Unforeseen site Conditions, Slow decision making, Client-initiated variations and work variations.

In general, this can also be elaborated as follows:

An activities completion may be delayed due to delayed start or extended activity duration. If activities completion is delayed, then it may cause delays in the succeeding activities which intern can cause a delay in the project completion. There are two types of causes of delay in construction projects: Internal & External causes.

4.4 MAJOR CASE OF DELAY in Ethiopian (internal case)

1. Owner Causes of delays by the owner due to

Lack of extension
Long line of authority in the project organization
Delayed approvals of schedules & change orders
Slow change order processing
Failure to obtain permits
Irrelevant milestone dates in documents
Construction Manager
Lack of experts in schedule management by designer
Implementation of specification
Inadequate record keeping
Inadequate schedule updates and process monitoring
On-site coordination
Job meeting

3. Contract document

Inadequate schedule clauses
Directing work order sequence by owner or architect/engineering
Drawing not indicating interface
Permitting responsibilities range
Milestone date and interface clauses
Leverage for enforcement of schedule specification

4. Contractor

Non-compliance with specification
Schedule updates not done
Reluctance to cooperate and coordination
Failure to meet milestone dates
Not following permit requirements

4.5 MINOR CASE OF DELAY in Ethiopian (External causes) of delays

These are which are beyond the control of both owner and contractor.

They include:

Force majeure
Exceptional adverse weather condition
Civil commotions or strikes use of fuel or labor
Material market instability
Governmental legislation

Act of God

4.6 METHOD OF ANALYSIS DELAY

Delay Analysis Approaches One of the most prevalent ways of assessing and handling claims is to analyze time delays suffered in the project. There are several methods through which this task can be performed. This article describes the four methods applied in the managing delay claims. They efficiently summarize the main approaches which have been differed so far in connection with analyzing the impact of claims on the schedule together with the advantage and disadvantages of each approach.

Planned VS As – Built Method

Impacted As-Planned Method

Collapsed As-Built (Known As But For Method)

Windows/Side Method

1) Planned VS as Built Method

This approach is probably the oldest and most straightforward one. It compares activities from Contractor's planned Baseline Schedule with the actual Completion Dates of delayed activities on the "As-Built Schedule. The activities or activities need to be clearly falling on the Baseline Critical Path.

Advantages:

It is simple to use and understanding

Mathematical computation only

Disadvantages: It assumes that the baseline schedule logic remains hold

It cannot deal with the issue of concurrent or parallel delays

It makes no allowances for mitigation measures

It does not consider the dynamic nature of critical path changes from time to time either by delayed activities and/or consumption of the float by other activities in other paths

Since the contractor is liable for other delay events caused by him, this approach is not recommended in arbitration and/or litigation

2) Impacted As- Planned Method

In this approach delayed event(s) by the client are incorporated in the planned Baseline Schedule and then the re-run is done to determine the resultant impact of the delayed event(s) to particular Milestones and overall project. In this method, the contractor inserts the owner caused delays only.

Advantages

Relatively simple to implement

Disadvantages

Highly subjective and theoretical, particularly if the result of this method projected particular date(s)

The contractor caused delays are not considered
It assumes the contractor always follows schedule logic
It does not consider the dynamic nature of critical path that changes from time to time either by delayed activities and/or consumption of the float by other activities in other paths
The preferential (soft) logics may exaggerate delays
It assumes that the owner is responsible for all delays in the project
Due to what is mentioned above, this approach is not recommended in arbitrary and/or litigation

3) Collapsed As- Built (Known as "But for "Method)

The beginning point of this approach is to develop" As- Built "schedule that affects the actual dates and actual sequence of schedule activities. In this method, the owner caused delay event(s) shall be removed from the As-Built schedule to show what the completion date for particular milestones and /or overall project completion would have been if the owner delay events had not occurred i.e. recalculate the schedule to determine new completion date in the absence of owner caused delays.

Advantages

As it based upon the as-built schedule, the certainly is enhanced that the outcome coincides with the actual situation on site
It is to understand
It is a technique that's well accepted and recognized in arbitrary and/or litigation

Disadvantages

It assumes that the existence of as-built critical path which can be perceived by the scheduler, in other words, methodology and application of technique is open to criticism between owner and contractor
Since the process involves re-construction of the as-built logic, the recreation of the critical path following the removal of the delay events may not be the same as the critical path that actually existed at the time of the delayed events.

4) Windows/Slide Method

Windows analysis (also known as contemporaneous method) is based on the analysis of the effect of delayed is based on the entire length of the project by looking at the events which have impact within the schedule at the reporting time period when the events occurred.

Advantages

This method considers the dynamic nature of the critical path
It is a technique well accepted and recognized in arbitration and/or litigation

Disadvantages

It is time consuming to develop.

4.6 CONTRACTUAL EFFECTS OF DELAY ON CONTRACTING PARTIES

Delay affects completion of projects and compromises quality, schedule and budget of deliverables. Delayed projects exhibit disputes, claims for time extension and additional costs, loss of productivity and efficiency, re-sequencing of works, abandonment and even termination. Amidst prolonged disputes between the contractors and the employers, the beneficiaries of the project are denied time and possession utility. Public confidence is lost when project delays and the working relationship among the parties deteriorate. It is not uncommon to find many reports on delayed projects justify the delays based on the reason why they occurred and ignoring the effects of such delays on completion of the projects with respect to cost, quality and schedule. It is important to expose the effects of delay on these three critical parameters because they are vital to project stakeholders and to the utility of the projects.

Effects of contractual delay components; design, payment, site possession and mobilization. Effects of contractual delay are composite and combination of mitigation measures is necessary to reduce their impacts

Cost overrun, Time overruns, negative social impact, idling resources and disputes are the main effects of delays. Many projects experience cost overrun and thereby exceed initial contract amount. The problem of cost over run, especially in the construction industry, is a worldwide phenomenon, and its ripples are normally a source of friction among clients, consultants and contractors on the issue of project cost variation. Project cost overruns create a significant financial risk to clients. However, in spite of the risks involved, the history of the construction industry is full of projects that were completed with significant Cost Overruns [Garry, 2005].

4.7 LEGAL EFFECTS OF DELAY ON CONTRACTING PARTIES

In Ethiopia, the number of public building construction projects is increasing from time to time. However, it becomes difficult to complete projects in the allocated cost and time. Taking into account the scarce financial resources of the country, cost overrun is one of the major problems in Ethiopia. Construction disputes are fairly common, and they vary in their nature, size, and complexity. Construction disputes, when not resolved in a timely manner, become very expensive – in terms of finances, personnel, time, and opportunity costs.

These delays will affect all involved parties specially clients and contractors in such a way that it incurs additional and expensive cost due to the legal process, dismissal from professional services, sub sequential damage both in terms of fines or image to public etc.

4.8 DELAY CLAIMS OF CONTRACTING PARTIES

Some of the most common disputes in construction cases relate to delay. However, delay claims tend to be some of the least understood and frequently confusing claims in the construction field. A clear understanding of the basic elements necessary to prove delay claims is invaluable in the processing of complex construction claims.

Much as it sounds, a delay claim on a construction project relates to a period of time for which the project has been extended or work has not been performed due to circumstances which were not anticipated when the parties entered into the construction contract. The most common causes of delay on a project include: differing site conditions; changes in requirements or design; weather; unavailability of labor, material or equipment; defective plans and specifications; and interference by the owner. Such delays will often force a contractor to extend its schedule to complete the work required under the contract, as well as to incur additional costs in the performance of said work. Generally, these costs may include: the costs of maintaining an idle workforce and equipment; unabsorbed office overhead; lost efficiencies; and general conditions. However, in order to receive an extension of time for project completion, or to recover additional costs, the contractor must meet a number of prerequisites.

Hence depending on the causes of delay, the contracting parties may raise their claims expecting compensation in return.

4.9 CONSTITUTES OF DELAY CLAIMS OF CONTRACTING PARTIES

To constitute claim tree requirements shall be fulfilled; i.e. substantive, procedural and proof requirements.

1. Substantive Requirements

Substantive requirement means supporting or giving justification for the claim by specifically citing or invoking the provisions of the Construction Contract; and/or of the applicable law.

The provisions of contract mean the relevant clause in the contract, which has been signed between the parties.

The provisions of the applicable law mean the relevant article of the law, which is applicable to the contract, for ex. the Civil Code.

The substantive requirement is also called the legitimacy requirement.

Submitting a claim, without first establishing its legitimacy, under the Contract and/or under the applicable law is a futile exercise with no guaranteed return.

Pursuing claims costs money & also corporate time.

2. Procedural Requirements

By procedural requirement we mean the serving of the required prior written notice to the designated party under the contract.

This is called intention to claim.

This prior written notice shall also be given within the contractually designated time scale.

The time scale might be specific or reasonable.

The contract under consideration may specify such time scale in either way.

The non-observance of the procedural requirement may result whole or partial loss of the substantive claim.

3. Proof Requirements

By proof requirement we mean the submission of the relevant documentation, which supports/corroborates the claims under consideration.

The relevant documentation may relate, for example, to:- time (delay & disruption) claims; cost (additional payment) & profit claims variations claims; and other claims;

They may contain a form of letters, notices or otherwise. Process

4.9. PROCEDURE OF DELAY CLAIMS OF CONTRACTING PARTIES

Claims Procedures

The claims process generally classified in to the following three phases ie Claim Submittal; Claim Processing; Claim Enforcement;

a) Claim Submittal

This is a process by which the claimant is obliged to claim within a reasonable period of time (28-30 days in most contracts) followed by the claimant's preparation for all substantial documents & legal aspects supporting its entitlements for an official submittal.

This constituted that a claim has been filed for its consideration if all the three sub processes called Claim. Notification, Claim Preparation & Claim Submittal are fully undertaken by the claimant

b) Claim Processing

This phase is classified further in to the following three sub-processes:

Claim Handling;

Dispute Resolution;

Claim Approval;

The Claim Handling, this sub-process initiates checking of the claim whether, it is legally or contractually supported or not, documents provided are valid and reliable to substantiate the claim for consideration or not, and overall procedural requirements have been followed or not. After verifying the validity of the claim proper computations & evaluations will be carried out to present the proposed compensation for the contractual parties the claim is applicable to.

Dispute Resolution, the contractual parties will pass through different dispute resolution system depending on their acceptance over the proposed compensation varying from the simplest mediation by the consulting engineer to the final court ruling in the form of litigation. Three types of dispute resolution systems are well recognized. These are,

Preventive Dispute Resolution System; (by use of partnering, dispute resolution advisors, facilitators, …)

Amicable Dispute Resolution System; (through negotiation, mediation, conciliation, mini-trial, …)

Judgmental Dispute Resolution System; (through Dispute Adjudication Board,

Arbitration, Litigation…) Where dispute was handled in any form of its resolution System, it is termed as Dispute Resolution.

Claim Approval,

Once the contractual parties agree on the final outcome of the claim process, then they have reached in to a stage where the claim is approved.

Claim Enforcement

This phase is sub-divided in to the following two sub-processes

Claim Enforcement;

Claim Closure;

The claim enforcement sub-process will entertain the inclusion of the approved claim in to payment certificates where their enforcement is due.

Once this compensation or entitlement is due in accordance with the approved claim and its enforcement requirements, then it is concluded for its closure**.**

In order to account for such an administration process contracts, provide claim clauses with in their provisions in their conditions of contract.

4.10. DELAY DAMAGE

It's reasonable to conclude that the term "delay damages" is simply defined as "damages that are caused by delay." But this definition depends on the how one defines the term "delay." For example, when the term "delay" is defined as only critical project delay (a delay that is responsible for extending the project duration), then the term "delay damages" can be narrowly defined as only the damages that result from the project's extended duration. The damages that would result from critical delay include the full battery of delay damages – overhead, unabsorbed, liquidated, idle equipment, labor and many other costs.

If delay is defined more narrowly as only non-critical delay (a delay that is not the cause of an extended project duration), then the potential damages are still there, but would likely not include extended field overhead costs ,unabsorbed home office overhead costs, and liquidated damages. For the purposes of this discussion, the term "delay damages" is defined broadly to apply to both critical and non-critical delays.

Note that in each of the following discussions of the different types of delay damages, the damage will be defined as being the consequence of a critical delay or just a non-critical delay.

4.10.1 Types of Delay Damages

As described above, delay damages come in many flavors and can be caused by both critical and non-critical delays. The following list includes the most common types of delay damages, but is not intended to be exhaustive:

Extended Field,

Unabsorbed Home Office Overhead,

Liquidated Damages,

Escalation,

Idle Labor and Equipment, and

Additional Material Storage

Calculating damages in cases of construction delays can prove especially tricky when an owner causes the delay. Why? Because a significant portion of a contractor's costs will need to be allocated among multiple projects. This article describes two types of overhead costs that require cost segregation or job-specific allocations and discusses several other types of damages a contractor could pursue — while a sidebar looks at remedies for owners who face delays caused by contractors. Delays in construction projects can lead to a cascade of negative financial repercussions for both owners and their contractors. The parties may even wind up in court.

Calculating damages in these cases can prove especially tricky when an owner causes the delay. Why? Because a significant portion of a contractor's costs will need to be allocated among multiple projects. But a qualified financial expert can help.

Two overhead allocations

A delayed contractor will likely seek damages to cover some of its overhead costs, but construction companies rarely segregate overhead by project. Two types of overhead costs will require cost segregation or job-specific allocations:

1. Extended field/job site overhead**.** This overhead classification consists of costs which are necessary to support the work at the jobsite and, therefore, are directly chargeable to the project. These costs represent indirect expenses associated with the project and can increase because of delays. Such items can include but aren't limited to the following:

Field office and equipment rental,

Project managers, supervisors and office workers,

Field office vehicles,
Field office utilities (including electricity, water and sewer usage), and
Supplies.
Contractual damages for these costs are based on the assumption that the original contract price included only the jobsite overhead costs necessary to support the project for the expected project completion timeline. Determining a reasonable method to allocate the costs to various jobsites or projects can be challenging when employees (such as supervisors) work on multiple jobsites, meaning their time must be allocated. Cost allocation is also necessary when a delay creates the need for additional supervision, equipment, reporting, quality control and scheduling.
2. Indirect overhead items**.** These claims are a contractor's "cost of doing business" and are frequently among the most contentious points of construction litigation. Disagreements often stem from the fact that such items can't be directly charged to a specific project. Examples include:
Salaries (for company officers, estimators, accounting staff and others not assigned to a specific project),
General and administrative costs, Insurance, and Taxes.
Unlike jobsite overhead, indirect overhead items generally are not directly increased by a project delay. However, slowdowns can impede the contractor's ability to generate revenue. As a result, project delays negatively impact profitability and lead to reduced margins.
the most common method. Under this method, a contractor must establish that 1) a compensable delay occurred, 2) the construction company was working on standby, and 3) the business couldn't take on other projects.
Additional contractor damages
Depending on the circumstances, a contractor could pursue several other types of damages including productivity losses and damages for escalation. Although a contractor typically assumes the risks related to the costs of labor, equipment and materials during the course of a project, contractors could be entitled to damages that result from increased production times that result from such delays.
For example, a construction company might postpone a materials purchase because of the delay. If the materials cost more when purchased later, the owner could be liable for the difference in costs. If, on the other hand, the contractor went ahead and bought the materials within the original period, it could seek damages to reimburse it for storage costs incurred because of the delay. In addition, the construction company could demand compensation for costs associated with idle labor and equipment.
On the upside, courts expect damaged parties to make reasonable efforts to mitigate their losses. So, a contractor's damages may be limited to the extent that managers failed to take steps to minimize damages once they knew about the delay.
Don't delay

The list of damages a contractor may seek following a construction project delay can seem daunting. But a qualified financial expert can help you determine whether these damages are reasonable by ensuring both the appropriate allocation of overhead and the reimbursement of legitimate charges under the contract. Furthermore, should the dispute land in court, the expert can present testimony on the proper calculation of damages.

What can owners recover**?**

In construction cases where delays are caused by contractors, architects or other parties, owners can usually recover either liquidated damages or actual damages. Construction contracts often include a liquidated damages provision that's triggered by certain types of contract breaches, such as a contractor's failure to complete its work on time. If a specified breach occurs, the construction company must pay the owner liquidated damages at an agreed-upon daily or weekly rate — generally from the contractual date for completion until the date of actual completion.

Alternatively, an owner can recover actual damages. Such damages might include the loss of use and revenue, increased financing costs, increased costs for other contractors, and additional administrative costs.

Your financial advisor can help determine a reasonable estimate of liquidated damages to include in your contracts. Moreover, if you end up in court, he or she can also calculate your actual damages.

4.11. ASSESSMENT OF LIQUIDATED DAMAGES OR DELAY DAMAGES

On many projects, where time is the essence of construction, the owner and the contractor Agree under the contract terms that if the contractor fails to complete the project by the stipulated date, it is financially liable to the owner for a pre agreed sum for each day beyond the specified completion date that it takes the contractor to finish the work. This amount of money represents the financial losses to the owner for such delays, and because it is difficult to determine the real values of the owner's losses, the pre agreed sum is considered as the actual damages suffered. This assessment is referred to as liquidate damage. The estimated amount of the liquidate damages per day may be a function of many think. It can be losses to the owner in connection with revenue producing the project. Similarly, it can be a function of profit the owner gets from that investment.

The basic rule is that a liquidated damages provision is enforceable if the amount represents a reasonable forecast, at the time of signing the contract, of the actual damages the owner might incur if the project is no completed by the contractual dead line. It is recognized that a precise determination of the owner's delay damaged is not possible. If the owner does not make a reasonable attempt to forecast its actual delay damages, the provision may be considered as unenforceable penalty, or an attempt to provide a negative incentive for timely contractor performance. 4.4 Assessment of LD/DD with respect to sectional completion

In the contract document if the contractor and the employer agreed on a sectional completion date of a work and if a contractor fails to perform such agreement under the

contract document he/ she is liable to pay a liquidated damage per day to the employer for that sectional work delay only.

4.12. ASSESSMENT OF LD/DD WITH RESPECT TO TOTAL COMPLETION

For a delay of a total works completion the contractor is liable to pay liquidated damages for the Employer which is calculated from the total project cost as agreed in the contract document. 4.12 Effect and management of Concurrent delay Concurrent delay is a complex term, the legal status of which remains unclear. Delays on project will have different contractual consequences depending on the cause of the delay:

Where a delay which impacts on the dates caused by the contractor, the contractor will be liable to pay liquidated and ascertained damages(LAD's) to the client.

Where a delay which impacts the date is not caused by either party, the contractor may be entitled to an extension of time.

Where the delay is caused by the client, the contractor may be able to claim an extension of time and expense. Concurrent delay refers to the complex situation where more than one event occurs at the same time, but where not all of those events enable the contractor to claim a time or to claim loss and expense. As it is rare for events to happen at precisely the same time, concurrent delay is sometimes defined as 'Two or more delay events occurring within the same time period, each independently affecting the Completion Date' (Judge Seymour -Royal Brampton Hospital National Health Trust v Hammond and Others), or, where the events may have happened at different times, but their effects (at least in part) are felt concurrently.

The difficulty arises in determining whether concurrent delay**s** allow a time and expense claims or liquidated and ascertained damages.

For example, the contractor may already have been delayed through their own fault, when another event occurs for which the clients at fault. In the case of Royal Brompton Hospital National

Health Trust v Hammond and Others, Judge Seymour stated that concurrent dela**y** did not mean '

a situation in which, work already being delayed, let it be supposed, because the contractor has had difficulty in obtaining sufficient labor, an event occurs which is a Event and which, had the contractor not been delayed would have caused him to be delayed, but which in fact, by reason of the existing delay, made no difference.'

In this scenario, the event did not in fact impact on the completion date, which was already delayed by the contractor. Where this is not the case – for example, in the case of Walter Lilly & Company

Ltd v Giles Patrick Cyrill Mackay it was considered that provided the events can be shown to have delayed the works, the contractors entitled to an time for the whole period of delay caused by the relevant events. There is nothing to suggest an extension should be reduced if the causation criterion is established.'

In the case of City Inn v Shepherd Construction, the Scottish Appeal Court decided that apportioning delay was appropriate where there was no dominant cause of delay. They concluded that:

The relevant event must delay or be likely to delay the works.

If a dominant cause can be identified, this must be the relevant event.

If no dominant cause can be identified, an apportionment should be made in a fair and reasonable way.

However, if the client contributes to an event, then they may not be entitled to liquidated and ascertained damages. For example, in the case of Peak Construction v McKinney Foundations, the judge ruled 'I cannot see how, in the ordinary course, the employer can insist on compliance with a condition if it is partly his own fault that it cannot be fulfilled…'

Furthermore, in Henry Boot Construction v Malmaison Hotel it was ruled that to take a simple example, if no work is possible on a site for a week not only because of exceptionally inclement weather (a relevant event) but also because the contractor has a shortage of labor (not a relevant event) and if the failure to work during that week is likely to delay the works beyond the date by one week, then if it considers it fair and reasonable to do so, the architects required to grant an time of one week. He cannot refuse to do so on the grounds that the delay would have occurred in any event by reason of the shortage of labor."

The situation is complex, and cases tend each to have circumstances that are unique in some way. Furthermore, cases of concurrent delay do not often reach the courts as they tend to be settled through resolution procedures. The resulting uncertainty is compounded by the differences in wording between various contract types. Keating states that a proper analysis of entitlement to time and any associated expense in each case must involve a careful consideration of the wording of the relevant clauses and an assessment of the (possibly different) tests of causation that should be applied to them in order for the contractor's actual entitlement to be arrived at.'

What is clear is that it is important for both parties to ensure they keep good records to demonstrate that the event did actually occur and that it did impact on the completion date. If it is possible to carry out a analysis that demonstrates the effect of events on the completion date, then this is beneficial, however, in the absence of such information it is likely that the courts will take a 'common sense' approach.

4.13 REGULATION OF DELAY UNDER MDB-FIDIC (2006), PPA (2011) & OTHER APPLICABLE LAWS

4.13.1. Delays under MDB-FIDIC (2006)

Regulation of delay under MDB-FIDIC conditions of contract is stated in the following clauses.

Table 4.1 Regulation of delay claims under MDB-FIDIC conditions of contract

No	Clause	Description
1	1.9	Delayed Drawings or Instructions
2	2.1	Right of Access to the Site
3	4.7	Setting Out
4	4.12	Unforeseen Physical Conditions
5	4.24	Fossil
6	7.3	Inspection
7	7.4	Testing
8	8.4	Extension of Time for Completion
9	8.5	Delays Caused by Authorities
10	8.6	Rate of Progress
11	8.7	Delay Damages
12	8.8	Consequence of Suspension
13	10.2	Taking Over of Part of the Works
14	10.3	Interference with Tests on Completion
15	13.7	Adjustments for Changes in Legislation
16	14.8	Delayed Payment
18	17.3	Employer's Risks
19	17.4	Consequences of Employer
20	19.1	Definition of Force Majeure
21	19.2	Notice of Force Majeure
22	19.3	Duty to Minimize Delay
23	19.4	Consequences of Force Majeure
24	20.1	Contractor's Claims

4.13.2. Delay under PPA (2011) conditions of Contract

Table 4.2 Regulation of delay under PPA (2011) condition of contract

No	**Clause**	Title and Description of the Subject Matter
1	11.1 &11.2	Employer's Risks
2	12.1	Contractor's Risks
3	21.1	Possession of the Site
4	28.1&28.2	Extension of the Intended Completion Date
5	30.1	Delays Ordered by the Engineer
5	32.1&32.2	Early Warning
6	40.4	Payment for Variations
7	40.5	Payment for Variations
8	44.1	Compensation Events
9	44.2	Compensation Events
10	44.3	Compensation Events
11	44.4	Compensation Events
12	49.1	Liquidated Damages
13	49.2	Liquidated Damages

4.13.3 Delay under other applicable laws

Table 4.3 Regulation of delay under applicable laws

No	Article	Title and Description of the Subject Matter
1	Art. 2355.	Effect of cancellation
2	Art. 2361	Amount of Damages
3	Art. 2552.	Professional diseases
4	Art. 2618.	Delay in execution of work
5	Art. 2620.	Defective execution of the task.
6	Art. 2737.	Delay in Return
7	Art. 2738.	Extension of the contract.
8	Art. 2918.	Duty to suffer repairs
9	Art. 3038.	Rescission of contract.
10	Art. 3199.	Delay of Suppliers
11	Art.3200	Preferential rights
12	Art.3206	Sub- contract
13	Art.3268	Time of Payment

Comparison between MDB-FIDIC and PPA Conditions of Contract Related to Delay.

Under this section of this study comparison shall be made between MDB-FIDIC and PPA Conditions of Contract related to delay claims. The comparison shall be limited to those clauses which have relevance to delay and associated delay claims.

Table 4.4 **Comparison between MDB-FIDIC and PPA Conditions of Contract related to Delay Claim**

No	MDB FIDIC 2006	PPA 2011
1	•. The notice shall be given as soon as practicable, and not later than 28 days after the Contractor became aware	• Does not specify a period with in which the contractor should give Advance notice of claims.
2	• Early warning is not precondition for entitlement	• Early warning is a precondition for entitlement of time or cost claim.
3	• The response by the Engineer towards delay claim should be within 42 days after receiving the claim.	• The response by the Engineer towards delay claim should be within 21 days after receiving the claim.

4	• Delay in advance payment is not a ground for claim but it changes the commencement date.	• Late payment of advance loan is a Compensable Event.
5	• Delays caused by change in legislation entitle the contractor for extension of time and addition cost.	• Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Special Conditions of
6	• Prices shall be adjusted for fluctuations in the cost of inputs only if provided for in the Special Conditions of	• Force majeure is not defined.
7	The contractor is required within 14 days to give notice in the event of occurrence of force	• No specific provision is available.
8	• Each party is required to minimize delay in the event of force majeure.	• No specific provision is available.
9	• In the event of failure to give notice to claim within 28 days of the occurrence of a circumstance, the contractor entitlement shall be	• Failure by the contractor to give early warning at the earliest opportunity shall nullify his entitlement of the

CHAPTER FIVE
DISRUPTION AND DISRUPTION CLAIMS

5.1 DEFINITION OF DISRUPTION

Disruption is loss of productivity, disturbance, hindrance or interruption to a Contractor's normal working methods, resulting in lower efficiency. In the construction context, disrupted work is work that is carried out less efficiently than it would have been, had it not been for the cause of the disruption. More broadly, some literatures defined "disruptions as an action or event which hinders a party from proceeding with the work or some portion of the work as planned or as scheduled.

Most standard forms of contract do not deal expressly with disruption. If they do not, then disruption may be claimed as being a breach of the term generally implied into construction contracts, namely that the Employer will not prevent or hinder the Contractor in the execution of its work. In Coastal Dry Dock & Repair Corp., disruption is noted as the "cost effect upon, or the increased cost of performing, the unchanged work due to a change in contract". In some studies, disruptions are defined as the occurrence of events that are acknowledged to negatively impact on labor productivity.

5.2 TYPE OF DISRUPTION

Disruptions caused by change can be both foreseeable and unforeseeable. The foreseeable or local disruptions can occur at the same time and either the same place or within the same resource as the changed work, whereas unforeseeable or cumulative disruptions can also occur at a time or place, or within resources, different from the changed work. The words **"**cumulative disruption**"** and **"**cumulative impact**"** can be used interchangeably.

Cumulative impact has been described as being "…the unforeseeable disruption of productivity resulting from the 'synergistic' effect of an undifferentiated group of changes. Cumulative impact is referred to as the 'ripple effect' of changes on unchanged work that causes a decrease in productivity and is not analyzed in terms of spatial or temporal relationships". Some researchers argued that when the Board states that cumulative impact cannot be analyzed in terms of spatial or temporal relationships, it means that cumulative impact costs cannot be secured within individual contract changes.

Pricing of the direct impact due to local disruptions and cumulative impacts due to cumulative disruptions is different.

The direct impact costs are prepared on a forward pricing basis.

The cumulative impact costs, on the other hand, are more often priced on a backward pricing basis as a contractor cannot foresee or readily quantify the impact. In other words, a cumulative impact claim addresses the changed work's effect on working conditions that will indirectly influence the unchanged work, whereas a direct impact claim covers the impact of changed work on unchanged work.

5.3 CAUSES OF DISRUPTION

Causes of disruption can be broken down into either external or internal causes.

A. External Causes External causes of disruption are generally not related to the project itself and will often fall into the force majeure category. They will include

Government acts

The passing of new regulations or laws,

Changes to the taxation regime, and

New development or investment programs.

Such events will generally involve certain rights of compensation to be passed on to the Contractor. External causes can also result from

Acts of God,

Earthquakes,

Hurricanes or a very cold winter.

Such risks can generally be insured against, and therefore the uncertainty that they would introduce into a project can be transformed into a certain insurance cost. The last type of external disruption relates to

Social or political events that disrupt normal societal functioning.

This can include the Outbreak of war, included non-declared war that nevertheless involves military or other disruptions to economic activity,

Rebellions,

Protests, and

General strikes In many cases, these too will be insurable risks and so the uncertainty they involve can again be avoided. Castri (2003) also notes the internal causes of disruption, which can be causally attributed to the project itself, its planning and design, and the manner in which the works are performed.

B. Internal Causes Internal causes of disruption can be further broken down into technical causes, including changes of design, design errors and construction errors; economic causes including difficulties in accessing or sourcing requisite materials, labor, or skills, and financial causes such as shortfalls in the project's ability to pay costs, unplanned resource, material or labor cost increases, and interest rate rises on borrowing. One of the most common causes of disruption is a variation or change order, coming from the employer, and amending what the contractor is required to do, or what the project is required to deliver this can occur even after work has commenced. Bramble and Callahan (2000) note the implications of disruption, which may include changes in the project scope, late completion, loss of possibility for early completion, and may be countered by acceleration of the work. Acceleration and other changes in response to delay, such as alternation of the sequence of the work, loss in efficiency, and extra time determined overheads will all cut into the potential profits of the contractor.

5.4 ROLE OF CONSTRUCTION PROGRAM IN CONSTRUCTION PROJECTS

Modern construction, which may involve specialist subcontractors and/or international suppliers, requires the managed interaction and coordination of the works. The increased complexity on site requires a rapid and reliable means of analyzing different events and effects, so that the process of construction can be managed efficiently. This is usually achieved through a programmed of works. Many modern construction contracts require the contractor to produce a programmed. The programmed of work is normally submitted by the Contractor after entering into the Contract. It is intended to assist the parties to plan and manage the Contract and the various interfaces between the Employer and the Contractor as well as other contractors. The programmed has two possible roles in the management of the contract, either a Monitor Role or a Dynamic Role. The Monitor Role allows the extent of compliance with the parties' obligations as to time to be assessed at particular stages. The Dynamic Role allows an analysis of progress to determine the corrective actions to be taken to comply with the particular obligation or to ascertain the right to compensation. Overall there are five functions of a programmed of which the first three are Monitoring Roles and two Dynamic roles. It is necessary to identify the intended role of the programmed in the contract, in order to decide the type of programmed required by the contract. The five functions of the programmed are shown below for the Monitoring Role and the dynamic Role:

A. Monitor

Milestone Program me

Progress Program

Prediction Program

B. Dynamic Role

Management Program

Compensation Program Each succeeding program me function in the above list requires an additional "dimension" from its predecessor in order to fulfill its role. The first, the Milestone Program me, is a single dimension comprising only a list of dates for activities. The simplest form is a single completion date for completion of the whole project. The second, the Progress Program me, includes not only dates but the durations of activities. The third, the Prediction Program me, requires Links between the activities which introduce a project dimension. The fourth, the Management Program me, requires not only Links but also a mathematical dimension, a predictive model, which allows the criticality of activities and float trends to be assessed to allow management decisions to be made. This usually requires a network analysis. The fifth, the Compensation Program me, introduces the complicated issues of the incidence of liability, causation and measurement of compensation, which is a legal dimension.

5.5 PROJECT DURATION

Project duration is a time elapsed from the date of commencement to the date of completion. Where a construction contract fixes a date for completion, but makes no provision as to the rate at which the works are to progress, it appears that the courts will not imply any such term. This is because, in the absence of any indication to the contrary, the contractor has absolute discretion as to how the work is planned and performed, provided only that it is completed on time. Furthermore, while many contracts require the contractor to submit a program for the execution of the works, this in itself does not mean that there is a contractual obligation to keep to that program. Indeed, it should be appreciated that, if there were such an obligation, it would apply to both parties. Thus the employer would have to ensure that the contractor was provided with all necessary information at such a time as to enable compliance with the program. From an employer's point of view, it would be very inconvenient to have no control at all over the progress of the contract works. It is for this reason that most construction contracts require the contractor to maintain a satisfactory rate of progress throughout the project**.**

5.6 .CONTRACTUAL EFFECTS OF DISRUPTION

There are two main terms used to describe the effect of events on program me. These terms are delay and disruption. Disruption is where an activity is adversely affected usually by another quite separate activity or some external event.

Delay and disruption have very important contractual effect. They describe the result of an event that will cause the completion to be later than planned of

One activity

A sequence of connected activities

The whole project, if the affect the critical path

The result of (1) and (2) may be additional cost directly to the activities in question. An effect on the critical path item (3) is much more serious contractually, because it will not only produce the increase in activity cost of items (1) and (2) but also the cost of disruption to the planned completion. This disruption to planned completion will mean that the contractor is on-site longer than was intended. The financial effect of this will normally be additional site overhead costs for every day or week of overrun. Additionally, (3) may entitle the contractor to more time to complete the project. However, whether the completion date extended or not depends on the forms of contract used and whether there is any terminal float available.

Most contracts have clauses which require the contract administrator to grant more time in which the contractor may complete the project. People accustomed to ICE contracts call this extra time

"an extension of time" (EOT) for completion of the project using the words of clause.

Construction

Contract Preparation and Management: From Concept to Completion by Geoff Powell
Some of contractual effects of disruption are time overrun, cost overrun, idling resources, delaying by the client to return the loans, poor quality of work…

5.7 LEGAL EFFECTS OF DISRUPTION ON CONTRACTING PARTIES

As noted previously, disruptions can be caused by change. These changes can reduce labor productivity and extend the project duration.. If disruption is caused by the Employer, it may give rise to a right to compensation either under the contract or as a breach of contract. Clearly not all disruption attracts the payment of compensation.
The contractor may be entitled to compensation for the effects of lost productivity to the extent that a breach of obligation exists, a causal link to the offending party can be established and the effects of that disruption calculated appropriately.
In practice noted in some literature; "contractors tend to blame such losses on owners and ask to be compensated. Owners, on the other hand, often blame a bad bid or poor project management and thus deny additional compensation for lost productivity. Given this situation the root cause of lost productivity is frequently a matter in dispute between owners, contractors and subcontractors."

5.8. METHOD OF ANALYSIS OF DISRUPTION ON CONTRACTING PARTIES

Disruptions to contractor's progress are commonly encountered in most construction projects and often result in productivity loss (or disruption) claims. The standard of proof set by the courts and other dispute resolution mechanisms for the recovery of such claims is onerous. The Analysis and Valuation of Disruption by Derek Nelson
There is a clear need for methods of quantifying the cost and time effects of disruption to be developed, and for such quantification methods to be used in disruption claims by contractor. Disruption claims are among the most difficult claims to quantify. The accurate quantification of the time and cost effects of such disruption is typically prevented because the role of labor/resource productivity is not fully recognized, site labor productivity is not correctly measure
The uncertainties, complexity, multiparty and dynamic environment that typify modern construction have led to many projects encountering various problems. The Egan report (Egan 1998) bears testimony to this, stating that recent studies in UK, US and Scandinavian countries suggest that up to 30% of construction is rework, labor is used at only 40-60 % of potential efficiency, accidents can account for 3-6 % of total project costs and at least 10% of materials are wasted. One of the most frequently encountered problems is disruption to contractors' progress, which causes inefficiencies or loss in productivity. Various studies have decried the high incidence of this problem in recent times. The UK's Society of Construction Law protocol on delay and disruption has defined disruption (as distinct from delay) as disturbance or interruption to a contractor's normal working methods resulting in lower efficiency or lost productivity (SCL 2002: 31). A common cause of disruption is therefore changes (or variations), which are often ordered

by employers. The negative impacts of changes on labor productivity are well documented in many studies. The impacts include stop-and-go operations, out-of-sequence work, and loss in productive rhythm, de-motivation of work force, loss in learning curve, unbalanced crews, excessive labor fluctuations, overtime, and working in adverse weather conditions. The occurrence of these events, if caused by the employer, may give rise to a right to compensation under either an express the contract or as a breach of contract Analyzing project disruptions to ensure that the responsible party compensates the claimant for the damages done is however often recognized as a difficult undertaking at its best (Schwarzkopf 1995; Ibbs 1997). A major cause of the difficulty is the fact that productivity losses are often attributable to multiple events and project participants (Leonard et al. 1988; Hanna and Heale 1994), where the events may occur simultaneously. This makes it difficult to unravel and sort out clearly what is often a tangled web or 'spaghetti' of interrelated issues and problems into their individual causes and effects. The situation is further exacerbated when the contractor's claim includes the unforeseeable impacts or 'ripple' effects of multiple change orders on work not covered by the change instruction. The cumulative (synergistic) impacts of these changes are particularly troublesome to resolve as described by a Construction Industry Institute report (Hester et al. 1991) - "when there are multiple changes on a project and they act in sequence or concurrently there is a compounding effect – this is the most damaging consequence for a project and the most difficult to understand and manage. The net effect of the individual effect of the individual changes is much greater than a sum of the individual parts".

Yet the standard of proof required for contractors to succeed with disruption claims must meet demanding objectives (Shea 1989; Klanac and Nelson 2004). These include presenting the claims using the best evidence available to prove cause and effect relationships of actions or inactions of the parties and making it clear and simple enough for the understanding of all parties involved (Gavin et al.2001: 82). Sadly, each of the existing methodologies for analyzing disruption is found to be unsatisfactory from a number of different aspects, particularly in proving cause and effect relationships (Schwartzkopf 1995; Klanac and Nelson 2004). Based on review of the literature a systematic methodology is proposed for performing the analysis in detailed, clear and equitable manner. The next stage of the study will focus on its validation and issues of its acceptability and usability in practice.

The common thread running through various texts, research documents and court decisions on construction claims is that for a contractor to satisfactorily recover its productivity losses three main elements must be proved (Lee 1983; Klanac and Nelson 2004):

Liabilit**y** - the employer was legally responsible for compensable disruption/impacts. These are events, which according to the contract entitle the contractor to compensation for any resulting additional costs.

Causation - establishing causal link between the impacts and the cost overruns incurred.

Resultant injury (or quantum**)**- the cost of the impacts as attributable to the employer's action or lack of it.

The first element is relatively easy to prove than the last two (Klanac and Nelson 2004). The proposed methodology thus focuses on these two challenging elements and does not address the legal aspects required to prove liability. To clearly satisfy the required proofs, the methodology considers two somewhat separate phases - causation and quantum phases.

The causation phase mainly involves the use of detailed project records and cause/effect matrix to establish the causal link between all disruption events and impacts giving rise to extra cost. The quantum phase, however, involve the use of critical path method (CPM) software with the capability of linking activities defined in the program me with their cost. This requires the use of activity-based approach to job costing in order to facilitate cost recordings against activities defined in the program. The project cost codes should therefore cover all elements of the work in appropriate detail with distinction between operations that exhibit different productivities. Detail discussions of the procedures involved are provided below.

Phase 1- Proving causation

This phase involves two main steps: Review of project documentation and establishing causal link.

Step 1-Review of project documentation

A number of researchers and expert commentators (Bubshait and Manzanera 1990; Cox 1997; AlSaggaf 1998; Baki 1999) suggest that the first port of call in the analysis of claims is for the analyst to gather and examine all available project information pertinent to the claim. Since disruption claims are more often about information on productivity impacts, the key information that require important examinations include:

Actual project resources utilization (labor, equipment/tools) with their status in the execution of relevant activities, i.e., working or not working-idle or broken down;

the reasonableness of the baseline program me as to its completeness, level of detail, logic, resource loading and planned productivity rate; and

Change order account and change conditions experienced on the project as a result of employer risk events. Other important documents that need review include: labor time sheets, manpower histograms, and physical progress curves, program updates, requests for instructions, daily reports, correspondence and payment certificates (Cox 1997). The essence of the review include to confirm the accuracy of the records and also to familiarize with the project's progress at any point in time (Bubshait and Manzanera 1990). Checking for their accurateness is central to proving compensable loss since it is from the records that one can establish the reasons for inefficiencies other than that for which the contractor is responsible.

Therefore, the records should as far as possible be documented contemporaneously throughout the project life in an accurate and organized manner (SCL 2002).

Step 2- Establishing causal link

The next key step is to establish the causal link between the actions or inactions of the parties and their corresponding effects that allegedly have resulted in additional cost. Three main steps involved in achieving this are as follows:

Step 2.1- Identify all changes in work conditions

Productivity losses are mainly caused by changes in the contractor's anticipated or planned working conditions, resources or manner of performing its work (Finke 1997). Thus to establish causal link, it is important for the analyst to first identify all changed conditions the project experienced by tracking all variances from the contract such as design interference, out of sequence work and over manning using project records.

Step 2.2 - Develop cause/effect matrix

Cause/effect matrix is a useful analytical tool for demonstrating graphically, a hierarchical analysis of the multiple cause/effect relationships between primary causes and final results in a number of different scenarios

(Pickavance 2005:497). To clearly trace the impact of employer caused disruptions, the analyst should develop such matrix to illustrate all the causes of the productivity loss including contractor-caused problems. The form of the matrix depends upon the extent of impact experienced, which can be very complex as series of multiple and duplicating effects may have to be shown.

Step 2.3 - Prove activities impacts using as-built program me

An as-built CPM program me reflecting the actual duration and sequence of activities should be developed either through regular program updates or retrospectively using project records. This program should be detailed enough to show the transpositions of the various stages of individual activities as a result of the disruptions encountered. The various impacts in the cause/effect matrix should then be linked to the various as-built activities. Starting with the first disruption event (a primary cause) the immediate and 'ripple' effects can be tracked through the as-built program by taking note of re sequencing of activities, their logical successors and concurrent activities. Chronologically, the impacts of remaining disruptions are also tracked. The start dates, finish dates and durations of each impact should be identified from the program and verified using the as-planned programmed, programmed updates and other project records. This provides credence to disruption claims in which the impacts consumed significant time though the contract did not extend beyond the original completion date (i.e they consumed available float).

Phase 2 - Proving quantum

The method proposed here for estimating the cost of disruption is based on window analysis principles. This involves the use of 'statuses' and updated program to analyses the impacts of disruptions by breaking the project up into series of time periods or 'windows'. The disruption events identified as causing the productivity loss are considered in succession as they actually

occurred and simulated on a cost/resource loaded CPM program me to determine their cost. The following gives detail description of the procedure involved.

Step 3- Development of updated cost/resource loaded program

Project planning software with capability of aggregating total actual costs from resources incurred by activities should be used to develop an updated fully cost/resource loaded CPM model. This would represent the actual cost and time incurred in carrying out the contract at various stages. Development of the first model entails going through the following:

The total project duration is divided into a number of time periods or 'windows' based on major changes in planning or major project milestones.

The first 'window', defined as the period between the baseline programs me and the first update, is updated to reflect the actual start and finish dates, durations and sequence of all project activities including delays and disruptions encountered.

Labor and plant/equipment used by each of the activities within this window are identified. Based on resources utilized the analyst allocates the actual costs incurred to each activity including all disruptions encountered.

To accurately capture the actual cost of disrupted activities, actual cost corresponding to disruption and no disruption components of such activities should be determined separately. This can be achieved by:

determining the scope of the impacted activity by reference to cost records and productivity data;

from this data, determine the likely measured mile period and the impacted period;

using the measured mile productivity, calculate the actual cost of the no disruption component of the activity and the impacted productivity values for the cost of the disrupted component;

Where it is impossible to use measured mile approach, industry standards and publications/guidelines could be relied upon.

With actual cost of all activities determined, the model is run to determine the 'actual cost of the project at the end of the first window' (TCPW). A copy of this model is saved and reserved for the development of a 'but for' model.

Step 4 - Development of a 'but-for' updated cost /resources program

The 'but for' model represents the actual cost of the project at the end of a period but for the employer-caused disruptions. That of the first window is developed as follows:

Using the cause/effect matrix developed, identify all compensable disruption events that occurred within the first window.

These events are then removed from the model developed in step 3 above to derive a 'but for' model that gives the cost of the project at the end of the first window but for the disruption of the employer.

The cost of compensable disruptions is thus given by the difference between the total cost

As represented in the 'but for' programmed and that prior to the removal.

Step 5- Quantifying disruption cost for the remaining windows

If the disruptions occurring in the first window are the only disruptions the project encountered, then the analysis ends, otherwise the analyst proceeds to examine subsequent windows as follows.

The period of the second window is determined and updated as in the first window using the first update as the beginning time period for the second window.

Repeat the procedures under steps 3 and 4 as described for the first window.

Do the same for the remaining windows as appropriate.

The total cost of disruption for which the contractor is to be compensated is given by the sum of all the disruption costs obtained for each of the windows.

Step 6 **–** Prepare claims report for settlement

Presenting the disruption claims results in an effective manner is vital to its smooth settlement through negotiation, arbitration, litigation or other forms of dispute resolution settings (Baki 1999). A claims report should thus be prepared to present the results clearly and concisely as possible. The report should focus on the main disruptions that were identified as impacting the project. Its content should include but not limited to:

•a narrative on the baseline programmed, productivity data, cost records and other vital project records that were used with regards to their reasonableness and any correction that were made;

• a factual story on how each of the employer caused disruptions resulted in increased costs by tracing paths in the caused/effect matrix with support or evidence from the project records; and

• a discussion on how costs attributed to employer-caused disruptions were arrived at and how any inefficiencies due to the contractor's own mismanagement have been accounted for in each of the period analyzed. In addition, modern communication mediums like graphic charts, photographs and CPM models are available to help present the results appropriately. Effective use of the graphics can simplify complicated issues and grabs the reader's attention or focus to the claimant's argument. The proposed methodology has the potential of enhancing the settlement of disruption claims because it performs the analysis in a detailed, clear and equitable manner. In spite of this advantage, there are a number of potential limitations. Firstly, the method requires the use of software that has the facility to link CPM programmed activities with their actual cost and allows for the cost of the project to be determined at any given stage. Planning software packages with such capability are likely to be expensive for the affordability of smaller firms. Secondly, implementation of the method requires that actual cost be measured at activity level. This approach to job costing makes it inappropriate to apply the method for projects in which cost codes were not defined to represent actual activities that occurred on site at the appropriate level of detail. For instance, if cost codes were defined at work package levels, actual cost associated with activities of the work package may be lumped together making it difficult to attribute the cost effect of disruptions impact on the individual activities. Finally, the methodology relies very much on the availability of accurate progress and cost information of all

activities, which may be lacking. However, this latter drawback equally applies to most existing methods for analyzing disruption claims. The construction industry is generally aware of the significant cost associated with disruptions and/or delays to contractor's progress. However, it is often recognized that proving these cost by contractors for their recovery in claims is an extremely difficult undertaking at its best. Whilst a number of methodologies are available for analyzing disruptions claims, each method is found to be unsatisfactory from a number of different aspects.

5.9 DISRUPTION CLAIMS

Complaints of 'disruption' and additional costs are routinely made during the course of a construction project yet they remain notoriously difficult to prove.

One of the main reasons for this is that productivity losses are often difficult to identify and distinguish at the time they arise, as opposed to other money claims which are more directly concerned with the occurrence of a distinct and compensable event together with a distinct and direct consequence, such as an instruction for a discreet variation during the progress of the works or a properly notified compensation event.

As such, most claims for disruption are dealt with retrospectively and the claimant is forced to rely on contemporary records to try and establish a causal connection for identified losses (cause and effect) which are all too often inadequate for the purposes of sufficiently evidencing a loss of productivity claim. When this happens the claimant is often forced into the situation where it advances a weak global or total cost claim of sorts to try and recover some of its .

Disruptions caused by change can be both foreseeable and unforeseeable. The foreseeable or local disruptions can occur at the same time and either the same place or within the same resource as the changed work, whereas unforeseeable or cumulative disruptions can also occur at a time or place, or within resources, different from the changed work. The words "cumulative disruption" and "cumulative impact" can be used interchangeably. Cumulative impact has been described as being the unforeseeable disruption of productivity resulting from the 'synergistic' effect of an undifferentiated group of changes. Cumulative impact is referred to as the 'ripple effect' of changes on unchanged work that causes a decrease in productivity and is not analyzed in terms of spatial or temporal relationships". Some researchers argued that when the Board states that cumulative impact cannot be analyzed in terms of spatial or temporal relationships, it means that cumulative impact costs cannot be secured within individual contract changesPricing of the direct impact due to local disruptions and cumulative impacts due to cumulative disruptions is different.

The direct impact costs are prepared on a forward pricing basis.

The cumulative impact costs, on the other hand, are more often priced on a backward pricing basis as a contractor cannot foresee or readily quantify the impact. In other words, a cumulative impact claim addresses the changed work's effect on working conditions that will indirectly

influence the unchanged work, whereas a direct impact claim covers the impact of changed work on unchanged work.

5.9.1 Constitutes of Disruption Claims

Construction contracts usually contain a "Changes" clause by which the owner can bilaterally or unilaterally request changes to the scope of work that is to be performed by the contractor, and these requests are typically converted into change orders. However, the owner's actions or inactions can also result in constructive changes to the contract. Change orders to adjust the contract price and time for completion result from a wide range of owner responsible events, including but not limited to, owner-directed increases or decreases in the scope of work to be performed by the contractor, owner-directed changes in the means and methods of the contractor's performance or the materials or equipment to be installed, owner-directed changes in the contractor's planned sequence in which the work is to be performed, design changes, changes in the performance specifications, differing site conditions, constructability issues, late responses to the contractor's properly prepared submittals and requests for information, delays in the delivery of owner-supplied materials and equipment, failure to secure permits in a timely manner, owner interference with the contractor's work, owner delays resulting in changes in the weather season during which the work is to be performed, changes due to actions or inactions of other trades working on the project for which the owner is responsible, and "constructive changes."

A directed change order or a constructive change typically entitles the contractor to a time extension if the changed work is on the then critical path, and to additional compensation not only for all direct costs, time-related costs, and costs for direct disruption that are caused by the change, but also indirect disruption costs for the unforeseen impact of the change on unchanged work. The disruptive effect of a change is a function of the size (man-hours and cost) of the change, the nature or scope of the change, the number of changes (although the number of changes may not be a sufficient determining factor in an assessment of cumulative impact), and the impact of the change on the other work. Also critical to the magnitude of the disruptive impact of a change is the time within the engineering and construction cycle when the change is issued. The further into the construction phase of the project, the greater the disruptive impact. If the changes are significant in scope and require significant additional man-hours to perform the changed and/or impacted work, direct and indirect disruption may occur.

The cost of direct disruption that is known and foreseeable should be included in the contractor's change order requests as they are submitted to the owner for approval.

The indirect disruption is often unforeseeable and referred to as the cumulative impact of changes. If requests for additional compensation for these indirect disruption costs are not included as part of the change order process because they are not foreseeable, cumulative impact claims may be submitted by the contractor, usually near or shortly after the completion of

the project. These cumulative impact claims most often seek recovery of the contractor's additional expenditure of resources, typically labor costs.

CHAPTER SIX
COMPARISON BETWEEN DELAY AND DISRUPTION

6.1 SIMILARITIES AND DIFFERENCES OF DELAY AND DISRUPTION

Delays and disruptions are among the challenges faced in the course of executing construction projects. Delays as well as disruptions are sources of potential risks that current studies are looking into ways to manage such as technical, social, economic, legal, financial, resource, construction and commercial.

Delays are specific, singular events of conditions that result in the project completion and/or a work activity starting or completing later than originally planned. Disruptions include the effects of individual or multiple delays, as well as interruptions to the planned method, manner, sequence, and duration of work activities directly and/or indirectly associated with the impacting event.

Disruptions usually affect labor productivity and can cause significant cost overrun variances in labor budgets. Disruptions are often contributing causes to a project delay when the delay-related impacts ripple throughout the project to both the work activities directly changed and the unchanged work not directly affected.

6.2 SIMILARITIES AND DIFFERENCES OF DELAY CLAIMS AND DISRUPTION CLAIMS

Due to the complexity of construction, combined with changes often inherent as a result of the very nature of construction, a contractor's actual performance can deviate significantly from its originally planned method, manner, sequence, and duration of work. A deviation can impact both the schedule performance period and the overall cost of the project. Determining the cause-and effect relationship of the impact is primarily the responsibility of the contractor even though the owner and contractor may both be responsible for assigning the result of the impact to the responsible party. One recognized entitlement theory that a contractor can utilize for recovering damages caused by an impact is "Delay and Disruption." Even though it is a common practice to generically refer to delay claims and disruptions as being synonymous, they are in fact very different, especially in terms of damages. For example, a contractor may experience a disruption to its planned method, manner, and sequence of work, but still complete the project on time without any total delay, through acceleration or by taking any mitigate measures. While "delay and disruption" issues are usually easily identified, the effects of these types of issues are very complex and often difficult to quantify. When determining if a delay and/or disruption have occurred, it is necessary to distinguish the technical difference between a delay and a disruption. These are distinctions of considerable significance. Once events have caused a delay and/or disruption, the next and most complicated tasks are to quantify the effects that the resultant impacts have on the contracted performance period and determine the costs associated with the

delay and/or disruptions. Quantifying the direct costs for delayed work can be a relatively simple task, but secondary disruption impacts caused by the "ripple" effect" require more sophisticated techniques. Costs can be segregated into two categories, delay costs and disruption costs.

Delay Costs include, but are not limited to:

Extended project management support

Extended engineering staff

Extended administrative support

Extended project and home office overhead, and general conditions costs

Idle tools and equipment, and

Direct costs of the change work directly affected by the delay

In addition to the aforementioned delay costs, Disruption Costs include, but are not limited to:

Efficiency decreased due to re-sequencing work or additional work activities in progress at a given time

Performance extended into a period of adverse weather

Dilution of supervision due to additional work activities to be manages

Overcrowding of trades, and

Acceleration– premium time/increases in manpower

Quantifying the costs associated with delay and disruption requires a cause and effect analysis addressing both the work directly and other work indirectly affected by the delay/disruption. Once the impacting events have been identified, demonstrating the resultant effects of the impacts on work in progress and successive work activities is crucial to recovery of delay/disruption damages.

To maximize the recovery of the costs associated with delay and disruption, contractors must illustrate how the planned method, manner, sequence, and duration of work were affected /changed. Methods for measuring impacts associated with delays are different than those for disruptions. Delays can often be adequately illustrated using a Critical Path Method (CPM) schedule. Disruptions usually affect productivity rates and labor costs and proof of impacts are best measured by CPM schedule analyses, trending analyses, labor productivity data, and "clean period" ("measured mile") analyses. In both cases, it is essential that the contractor have a CPM schedule developed prior to mobilizing to the project site or beginning work, and to status the schedule as the project progresses. If a delay does occur, it can be incorporated into the CPM schedule network using a "Time Impact Analysis" to illustrate the net effect of the delay on individual work activities and the contract performance period.

With the ever-present, day-to-day directed and constructive changes that occur on a construction project, and the burden of proof resting with the contractor, Contractors can maximize their recovery of delay and disruption damages by:

Identifying impacts relative to delay and disruption as they occur

Notifying the owner and reserving contractual rights to recovery

Knowing and understanding the appropriate contract clauses which allow recovery
Proving damages with credible and supportable cost and schedule data, and
Explaining and demonstrating the causal link(s) in detail
If a contractor does not have sufficient factual data (e.g. contemporaneously prepared letters, supporting cost and schedule information, daily reports, etc.) to support the local and global effects of the delay and/or disruption on its work performance, costs, and schedule, then the chances of a fair and reasonable adjustment may be diminished.

CHAPTER SEVEN
ROLE OF ENGINEER

7.1 CONCEPT

Who is the 'Engineer'?

The 'Engineer' is defined as the person appointed by the Employer and named in the Appendix to Tender. The word 'person' can mean a company, so the Engineer may be named as a firm of Consulting Engineers rather than an individual.

If the Engineer is a company, then the company should designate an individual to carry out the role of the Engineer.

The Engineer has an extremely important role in the administration of the Contract and the way in which he carries out his duties will have a major impact on the work of the Contractor and the success of the project.

7.2 ROLE OF ENGINEER

The engineer's role is central to any construction projects. in projects where a number of contractors may be awarded portions (packages) of the construction project, the issues of site possession, site security and care of the works should be approached differently. Consequent coordination issues arise. this may necessitate y special expertise to undertake administrative and coordination aspects of construction. as such, the engineer's role may be performed by two engineering consultants: technical supervision & construction manager.

The role of the Engineer in accordance with FIDIC

Engineer's Duties and Authority

The Engineer shall carry out the duties specified in the Contract.

The Engineer may exercise the authority specified in or necessarily to be Authority implied from the Contract, provided, however, that if the Engineer is required, under, the terms of his appointment by the Employer, to obtain the specific approval of the Employer before exercising any such authority, particulars of such requirements shall be set out in Part II of these Conditions. Provided further that any requisite approval shall be deemed to have been given by the Employer for any such authority exercised by the Engineer

Except as expressly stated in the Contract, the Engineer shall have no authority to relieve the Contractor of any of his obligations under the Contract.

Engineer's Representative Sub-clause 2.2

The Engineer's Representative shall be appointed by and be responsible to the Engineer and shall carry out such duties and exercise such authority as may be delegated to him by the Engineer under Sub-Clause 2.3.

Engineer's Authority to Delegate Sub-Clause 2-3:

The Engineer may from time to time delegate to the Engineer's Representative any of the duties and authorities vested in the Engineer and he may at any time revoke such delegation.
Any such delegation or revocation shall be in writing & shall not take effect until a copy thereof has been delivered to the Employer and the Contractor. Sub-Clause 2-3:
Any communication given by the Engineer's Representative to the Contractor in accordance with such delegation shall have the same effect as though it had been given by the Engineer. Provided that: Sub-Clause 2-3: any failure of the Engineer's Representative to disapprove any work, materials or Plant shall not prejudice the authority of the Engineer to disapprove such work, materials or Plant and to give instructions for the rectification thereof, and Sub-Clause 2-3:
If the Contractor questions any communication of the Engineer's Representative he may refer the matter to the Engineer who shall confirm, reverse or vary the contents of such communication.
Appointment of Assistants Sub-Clause 2.4:
The Engineer or the Engineer's Representative may appoint any number of persons to assist the Engineer's Representative in the carrying out of his duties under Sub-Clause 2.2. Sub-Clause 2.4: He shall notify to the Contractor the names, duties and scope of authority of such persons. Such assistants shall have no authority to issue any instructions to the Contractor save in so far as such instructions may be necessary to enable them to carry out their duties and to secure their acceptance of materials, Plant or workmanship as being in accordance with the Contract, and any instructions given by any of them for those purposes shall be deemed to have been given by the Engineer's Representative.

Instructions of the Engineer

The Engineer may issue to the Contractor (at any time) instructions and additional or modified Drawings which may be necessary for the execution of the works and the remedy of any defects, all in accordance with the Contract.
The Engineer has the power to issue additional or modified drawings. This is an important power because many Contracts under the FIDIC Conditions of Contract rely on a small number of Drawings in the Tender documents. Instructions in Writing
Instructions given by the Engineer shall be in writing, provided that if for any reason the Engineer considers it necessary to give any such instruction orally, the Contractor shall comply with such instruction. Confirmation in writing of such oral instruction given by the Engineer, whether before or after the carrying out of the instruction, shall be deemed to be an instruction within the meaning of this Sub-Clause. Provided further that if the Contractor, within 7 days, confirms in writing to the Engineer any oral instruction of the Engineer and such confirmation is not contradicted in writing within 7 days by the Engineer, it shall be deemed to be an instruction of the Engineer. Replacement of the Engineer
If the Employer intends to replace the Engineer, the Employer shall not less than 42 days before the intended date of replacement, give notice to the Contractor of the name, address and relevant experience of the intended replacement Engineer.

The Employer shall not replace the Engineer with a person against whom the Contractor raises reasonable objection with supporting particulars.
However a change to the named individual, when the Engineer is a company, does not require this notification.
Reasonable notice and discussion would assist in efficient administration.
A change of Engineer could also mean changes to other assistants appointed.
The Contractor should indicate as quickly as possible whether he intends to object to the replacement Engineer so that the 42-day period can be used as a changeover period as well as a notice period. Determinations The Engineer shall consult with each Party in an endeavor (try) to reach agreement. If agreement is not achieved, the Engineer shall make a fair determination in accordance with the Contract. The determination must express the rights and obligations of the Parties in accordance with the Contract and the applicable law, regardless of the preference of either Party.

CHAPTER EIGTH
CONCLUSION AND FINDING, RECOMMENDATION

8.1. Introductions

This chapter summarizes the major findings of the study in relation to the objectives and Research Questions provided in chapter one, conclusions and suggestions for further Research. Completing projects on time is an indicator of efficiency, but the construction process is subject to many variables and unpredictable factors, which result from many sources. These sources include the performance of parties, resources availability, environmental conditions, involvement of other parties, and contractual relations. However, it rarely happens that a project is completed within the specified time.
Time is of great essence in the construction industry, time management is critical in Determining the quality of a construction project. Ironically it is the dual elements of time and money that cause some of the most time and money consuming disputes.
One of the most troubled and complicated area is that relating to the concept of concurrent delay, which is a strongly contested topic in the building and construction industry. Both parties to a construction contract regularly use concurrent delay as an excuse to avoid responsibility for extension of time claims and the assessment of Liquidated damages. The rationale of this evaluation is: To appraise the major causes of delay that result in disputes in terms of the impact on the parties involved in order to minimize the delays and ultimately improve the functionality of management of projects within the Construction industry. The aim of this research was to find among other things the following:
To identify the Causes of delays in large civil engineering project in Ethiopian
To establish the significant causes of delay in these projects and to formulate a structure to mitigate the projects delay.

8.2. ANALYSIS OF FINDINGS

The results from the desk study; interview and questionnaire survey will be presented, interpreted And analyzed in detail in this part.

Interview is one of the primary data collection methods which is flexible and adaptive way of Investigating underlying motives of a subject in a way that self administered questionnaires can not. The interview undertaken for this Project was based on semi structured style. This type of Interview has a predetermined set of questions (generalized form of questionnaire) with a flexible order depending on what the interviewer perceives the subject matter by looking at the respondent capability and exposure or experience. The interview for this thesis was made with seven reputed professionals of the sector. From these interviewed professionals, three of them are from contractor side, the three others are from consultant sides and the remaining one is a construction lawyer well versed with conditions of contract to cover the legal aspect of contract forms. 8.3 .Secondary Data Sources

In addition to books, journals and internet sources, archival document, and correspondences have been reviewed to understand the background of contract provisions, problems and practices in the Construction sector. These secondary sources provide a general understanding of the subject area by presenting a wide range of ideas in the field which help to supplement other specific information obtained from the primary data sources.

8.4. Questionnaire Response Rate

Out of the 60 questionnaires: 18 were distributed for Employers, 20 for consultants, 17 for Contractors and 5 for senior Ethiopian engineers working in international financiers

Before starting the analysis, the returned questionnaires were checked for their reliability

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Respondents Category	Questionnaires		Percentage	Valid Responses	Percentage
	Distributed	Returned			
Employers	18	15	83	13	72
Consultants	20	14	70	14	70
Contractors	17	13	77	12	71
International Financiers	5	1	20	1	20
Total	**60**	**43**	**71.67**	**40**	**66.67**

It is evident from the table that employers (35% of returned) have the highest percentage followed

by consultants (34%). Contractor have the least response rate (30%) compared to employers and

Consultants. The response from international financiers is almost negligible to be considered in the analysis. The percentages of returned questionnaires were shown in the figure below.

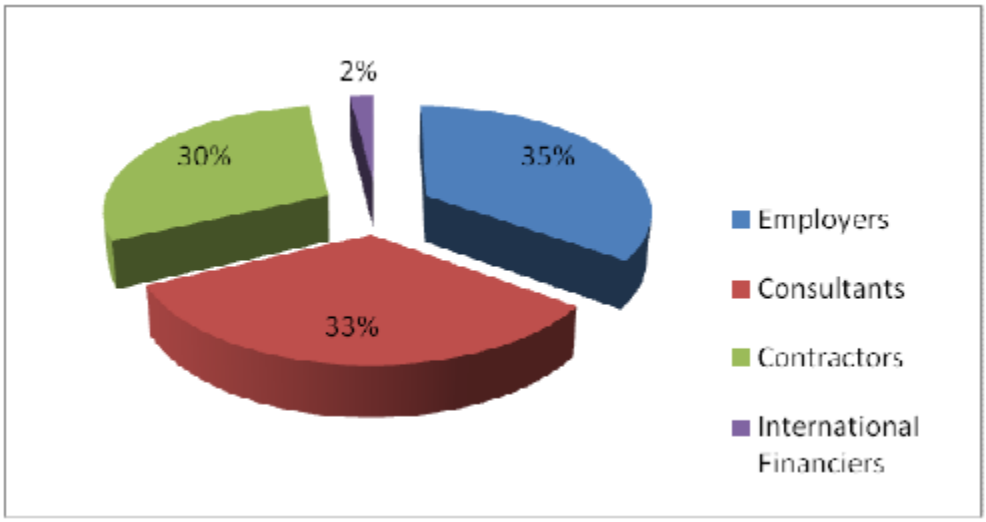

Chart 1 Return question respond

8.5 .Results and Discussion

Civil engineering works: building construction are the main civil engineering projects. Experience and exposure to delay has been shown to influence building industry. The fact That the number of respondents in building was high also helped to analyze the causes of Delay diligently. Causes of delay: according to the analysis on the chart, the most significant causes of delay include; non-payment, poor management and design changes by client. Effect of delay: from the analysis done earlier in the chapter, it indicates that the main impacts on civil engineering projects by delay are disappointment and arbitration.

Reaction of delay: according to the respondents, the average projects in magnitude are the most affected by delay.

8.6 .Project finding

From the results of the study, it came out clearly that contractors responded less than the Consultants and the clients but those they were (contractors) well experienced. The exposure response of the participants indicated that building/housing had the highest rank as having been undertaken comprehensively compared to other construction works scubas water, roads electrical etc. from questioners the major causes of delay

According to the results of the field data honoring interim certificates of payment by the client, poor management by the consultant which comes about when they do not supervise work diligently, and design changes by the client and the architect.

According to the analysis of data in the said sections, thus questions 8& 9 the projects that mostly react to delay are those of average in magnitude. Therefore it is recommended that in these projects and any other civil engineering projects the contract documented

Instructions, terms and rules are followed strictly with diligence by the supervision team and the contractors to mitigate delays.

8.7 Conclusion.

The main aim of this study and evaluation of data was to appraise the major causes of delay that result in disputes in terms of the impact on the parties involved in order to minimize the delays and ultimately improve the functionality of management of projects within the construction industry. According to the analysis of collected data and findings, we have been able to gather main causes of delay, their impact and recommended good mitigation measures.

Causes of delay

Based on the different groups of delay, the respondents generally agreed that the top three groups of delay are: financial, Design changes and mismanagement. From the many factors gathered in the literature review that agreed with the findings gathered, they were grouped into broad group Financial, Material, Scheduling and control and Design changes factors.

8.8 RECOMMENDATION

The recommendations are designed for the Government and non-government sponsored clients, Engineers/Consultants, and Contractors

It is important to adopt the recommendations made in this research, that there is need for change of structural organization and empress an effective management system in construction projects. Nonpayment to the workers leads to lack of motivation to work. Therefore, the client should pay the contractor according to the terms of contract to avoid disappointments.

Motivating participants towards work.

Projects to be fully designed at the initial stage. Bonus schemes to be introduced to help Contractors.

Contracting parties should look at the big picture behind the accomplishment of any said project which will later enhance and facilitate the lives of many.

All Contracting parties should enter into a contract with clear understanding of the contract they are signing. This helps contracting parties to know and appreciate the duties and responsibilities they have and work towards achieving that.

All professionals should give prior attention to contractual procedures, data collection, site recordings, communications and contractual and legal procedures as much as given to the actual work The knowledge gap in the contract administration of the projects has been a key problem. The lack of a proper administration of the claims is largely observed in local contractors hence to fill the gap short term training skills development seminars is required.

Capacity building programs and trainings should be conducted to all professionals and companies of the industry by prioritizing the need.

Transparent and reliable procurement system should be adopted and/or used to better select competent professionals to execute any projects to ultimately minimize time related disputes caused due to these poor procurement approaches.

Adequate time to complete a project, less variation works, completed design, proper timely supervision, prevailing site conditions, on time payment enforcement etc should be carefully addressed by consultants/Engineers

Proper use of advance/interim payments, proper and adequate Human and equipment resources, realistic program, updated and modern construction technologies and methodologies, ahead of time preparation on contract document and drawings, proper billing during bid, site visit etc should be the critical issues to be addressed by the contractor. Properly selecting Designing and supervising Engineers allocate sufficient budget, execution of timely payment, entertaining of conditions of contract and be obedient to procedures, tolerable variation works and redesigns etc. are among the most important areas where the client should work better on.

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APPENDIXA
COMPARION DEAY UNDER FIDIC &PPA

				Clause 75.2 If the Contractor's priced proposals for acceleration are accepted by the Public Body, they are incorporated in the Contract Price and treated as a modification
Delay Damages	8.7	If the Contractor fails to comply with Sub-Clause 8.2 [Time for Completion], Contractor shall subject to notice under Sub-Clause 2.5 pay delay damages to the Employer for this default. These delay damages shall be the sum stated in the Contract Data, However, the total amount shall not exceed the maximum amount of delay damages	74	Compensation Events Clause 74.1 The following shall be Compensation Events allowing for time extension: The Public Body does not give access to a part of the Site by the Site Possession Date stated in the Contractor's approved work program; The Public Body modifies the Schedule of other Contractors in a way that affects the work of the Contractor under the Contract; The Engineer unreasonably does not approve a subcontract to be let;
Suspension of Work	8.8	The Engineer may at any time instruct the Contractor to suspend progress of part or all of the Works. During such suspension, the Contractor shall protect, store and secure such part or the Works against any deterioration, loss or damage.	20	Refers suspension and described under the sub clause 20.1 and 20.5 as follows The Contractor shall, on the order of the Engineer, suspend the progress of the works or any part thereof for such time or times and in such manner as the Engineer may consider necessary. If the period of suspension exceeds 120 days and the suspension is not

		The Engineer may also notify the cause for the suspension.		due to the Contractor's default, the Contractor may, by notice to the Engineer, request permission to proceed within thirty (30) days or terminate the contract.
Consequences of Suspension	8.9	If the Contractor suffers delay under Sub-Clause 8.8 [Suspension of Work] and/or from resuming the work, the Contractor shall give notice to the Engineer and shall be entitled subject to		

INVESTIGATING DELAYS IN CIVIL ENGINEERING PROJECTS IN ETHIOPAN UNDER MDB- FIDIC& APPLICABLE LAW

QUESTIONERY FORM

APPENDIXC A

PART A BIO DATA

TICK THE APPROPRIATE BOX

Q1. Which is your position in the project?

☐ Arch ☐ Client ☐ Eng. ☐ Qs ☐ Contractor ☐ Sub-Contractor

Q 2. What is your experience in years in the Construction Industry?

☐ Above 25yrs ☐ 16-25 yrs. ☐ 11-15yrs ☐ 5-10yrs ☐ 2-5yrs ☐ 0-1vrs

PARTE B- PROJECT DATA

Q 1. Which type of project have you been exposed to?

☐ Roads ☐ Water ☐ Building ☐ Sub Contracts ☐ Labour based ☐ Others (specify)

Q2. Have you experienced any delays in any construction projects? If yes, what could have been the cause(s)?

Q3. What size of project have you been involved in?

☐ 2-35 Billion ☐ 1-2 Billion ☐ 500M- 1Billion ☐ 101- 500 Million ☐ 51-100 Million ☐ 1-50 Million

PART C- INDICATOR DELAY

QI Based on the following what in your opinion would be the largest contributor to delays?

Changes in design

Delay in instructions honoring payments

Mismanagement

Incapacity

Weather conditions

PART D – EXPOSURE IN THE INDUSTRY

Q 1 Based on your experience in your current projects, what would you point to be the Largest impact /effect of delay?

Arbitration/ Litigation

Claims Cost and time overdue

Poor quality

Client dissatisfaction

loss of reputation

PART E –SUGGESTION ON BEST PRACTICE

Q1. In your opinion what is the average delay in the project you have been exposed to?

5-10% 11-15% 16-20% 21-25% 26-30%

31% and above

Q2. What action do you take when you realize that your project is getting delayed?

Ask for extension of time Recapitalize the project Employ more resources

Change the structural organization Sub –contract the works request for change of scope and

obligation.

PARTF-RESPONDENTOPINION

Q.1 .What would you like to be done to improve on mitigation of delay in construction projects?